Final
Fourth Quarter 2014 - Quarterly Groundwater Monitoring Report Inside Tunnel Wells

Red Hill Bulk Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

DOH Facility ID: 9-102271
DOH Release ID: 990051, 010011, 020028, and 140010

January 2015

Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH HI 96860-3139

NAVFAC
Naval Facilities Engineering Command
NAVFAC HAWAII

Contract Number N62742-12-D-1853, CTO 0002

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Prepared for:

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Naval Facilities Engineering Command, Hawaii
400 Marshall Road
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Prepared under:

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FINAL
FOURTH QUARTER 2014 - QUARTERLY GROUNDWATER MONITORING REPORT
INSIDE TUNNEL WELLS
RED HILL BULK FUEL STORAGE FACILITY

Long-Term Groundwater and Soil Vapor Monitoring
Red Hill Bulk Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

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ACRONYMS AND ABBREVIATIONS

ACRONYMS/ ABBREVIATIONS	DEFINITION/MEANING
%	percent
bgs	below ground surface
COPC	Contaminant of Potential Concern
DLNR	State of Hawaii Department of Land and Natural Resources
DoD	Department of Defense
DOH	State of Hawaii Department of Health
DON	Department of the Navy
EAL	Environmental Action Level
EPA	Environmental Protection Agency
ESI	Environmental Science International, Inc.
F-76	Marine Diesel Fuel
ID	Identification
JBPHH	Joint Base Pearl Harbor-Hickam
JP-5	Jet Fuel Propellant-5
JP-8	Jet Fuel Propellant-8
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
µg/L	micrograms per liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAVFAC	Naval Facilities Engineering Command
NAVSUP FLC	Naval Supply Systems Command Fleet Logistics Center
PAH	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
pH	hydrogen activity
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SSRBL	Site-Specific Risk-Based Level
TEC	The Environmental Company, Inc.
TPH-d	Total Petroleum Hydrocarbons as diesel
TPH-g	Total Petroleum Hydrocarbons as gasoline
U.S.	United States of America
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WP	Work Plan

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EXECUTIVE SUMMARY

This quarterly groundwater monitoring report presents the results of the fourth quarter 2014 groundwater sampling event, conducted on October 27 and 28, 2014, at the Red Hill Bulk Fuel Storage Facility [RHSF], Joint Base Pearl Harbor-Hickam [JBPHH], Hawaii. The RHSF is located in Halawa Heights on the Island of Oahu. There are 18 active and 2 inactive Underground Storage Tanks [USTs] located at the RHSF. The State of Hawaii Department of Health [DOH] Facility Identification [ID] number is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF and concurrent with release response activities initiated at Tank 5 in January 2014, under Naval Facilities Engineering Command [NAVFAC] Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved 2012 Work Plan [WP]/Sampling and Analysis Plan [SAP] prepared by Environmental Science International, Inc. [ESI].

On October 27 and 28, 2014, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01). A primary and duplicate sample were collected from well RHMW02. A summary of the analytical results is provided below.

- **RHMW01** – Total Petroleum Hydrocarbons as diesel fuel [TPH-d] (120 micrograms per liter [µg/L]) and lead (0.0976 µg/L) were the only analytes detected. The TPH-d concentration exceeded the DOH Environmental Action Level [EAL] for gross contamination, but was below the site-specific risk-based level [SSRBL] of 4,500 µg/L for Total Petroleum Hydrocarbons [TPH]. TPH-d concentrations in this well have shown an overall decreasing trend from a high of 1,500 µg/L in February 2005.
- **RHMW02** – TPH-d (2,000 µg/L in both primary and duplicate samples), Total Petroleum Hydrocarbons as gasoline [TPH-g] (57 and 53 µg/L), xylenes (0.32 and 0.29 µg/L), acenaphthene (0.53 µg/L in both primary and duplicate samples), ethylbenzene (0.15 and 0.14 µg/L), 1-methylnaphthalene (59 and 54 µg/L), 2-methylnaphthalene (43 and 36 µg/L), naphthalene (140 and 130 µg/L), and lead (0.165 µg/L in only the duplicate sample) were detected. TPH-d was detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination, but below half the SSRBL. The polycyclic aromatic hydrocarbons [PAHs] 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene were detected at concentrations above the DOH EALs for both drinking water toxicity and gross contamination. The concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene increased to their highest levels in over 5 years. The concentrations of these PAHs are also significantly higher than they were in January 2014, when a high TPH-d spike was observed in this well.
- **RHMW03** – TPH-d (80 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs or the SSRBL.

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- **RHMW05** – TPH-d (16 µg/L) was the only analyte detected. The concentration did not exceed the DOH EALs or the SSRBL.
- **RHMW2254-01** – TPH-d (22 µg/L) and total lead (0.211 µg/L) were the only analytes detected. The concentrations did not exceed their respective DOH EAL.

During this quarterly event, the TPH-d concentration in RHMW01 exceeded the DOH EAL for gross contamination and the concentrations of TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 exceeded the DOH EALs for both gross contamination and drinking water toxicity. Groundwater contaminant concentrations in wells RHMW03, RHMW05, and RHMW2254-01 remained at low concentrations and did not change significantly from the previous event, or were not detected.

Concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 have shown an increasing trend since March 5, 2014, but have remained below the historic maximums detected in the well. These PAH concentrations were an order of magnitude higher than they were during January 2014, when a TPH-d spike was observed but PAH concentrations remained below DOH EALs for gross contamination. Based on the groundwater monitoring data, TPH-d and PAH concentrations in RHMW02 appear to be decoupled. All other analytical results were generally consistent with historical data.

Based on the groundwater monitoring results and the reported release at Tank 5 in January 2014, continued groundwater monitoring at the wells inside the RHSF tunnel is recommended. The next quarterly event is tentatively scheduled for January 2015.

SECTION 1 – INTRODUCTION

This quarterly groundwater monitoring report presents the results of the fourth quarter 2014 groundwater sampling conducted on October 27 and 28, 2014, at the RHSF, JBPHH. The RHSF is located in Halawa Heights on the Island of Oahu. The purpose of the sampling is to (1) assess the condition of groundwater beneath the RHSF with respect to chemical constituents associated with jet fuel propellant and marine diesel fuel, and (2) to ensure the Navy remains in compliance with DOH UST release response requirements as described in Hawaii Administrative Rules Chapter 11-281 Subchapter 7, *Release Response Action* (DOH, 2013). The DOH Facility ID number for the RHSF is 9-102271. The DOH Release ID numbers are 990051, 010011, 020028, and 140010.

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP prepared by ESI (ESI, 2012).

1.1 SITE DESCRIPTION

The RHSF is located on federal government land (zoned F1- Military and Federal), located in Halawa Heights, approximately 2.5 miles northeast of Pearl Harbor (Figure 1). It is located on a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The RHSF is bordered on the north by Halawa Correctional Facility and private businesses, on the southwest by the United States of America [U.S.] Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. A quarry is located less than a quarter mile away to the northwest. The RHSF occupies 144 acres of land and the majority of the site is at an elevation of approximately 200 to 500 feet above mean sea level.

The RHSF contains 18 active and 2 inactive USTs that are operated by Naval Supply Systems Command Fleet Logistics Center [NAVSUP FLC] Pearl Harbor (formerly Fleet and Industrial Supply Center). Each UST has a capacity of approximately 12.5 million gallons. The RHSF is located approximately 100 feet above the basal aquifer. The USTs contain Jet Fuel Propellant-5 [JP-5], Jet Fuel Propellant-8 [JP-8], and Marine Diesel Fuel [F-76]. The current status of the USTs are summarized in Table 1.1.

Four groundwater monitoring wells (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01) are located within the RHSF lower access tunnel (Figure 2). Three groundwater monitoring wells (wells HDMW2253-03, OWDFMW01, and RHMW04) are located outside of the RHSF tunnel system. Monitoring data for the three wells located outside the tunnel are included in a separate report.

As noted, monitoring wells RHMW01, RHMW02, RHMW03, and RHMW05 are located inside the underground tunnels. Sampling point RHMW2254-01 is located inside the infiltration gallery

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of the Department of the Navy [DON] drinking water supply Well 2254-01. The DON Well 2254-01 is located approximately 2,400 feet downgradient of the USTs and provides potable water to the JBPHH Water System, which serves approximately 65,200 military customers. NAVFAC Public Works Department operates the infiltration gallery and DON Well 2254-01.

TABLE 1.1
Current Status of the USTs
Red Hill Bulk Fuel Storage Facility
October 2014 Quarterly Monitoring Report

Tank Identification	Fuel Type	Status	Capacity
F-1	None	Inactive	12.5 million gallons
F-2	JP-8	Active	12.5 million gallons
F-3	JP-8	Active	12.5 million gallons
F-4	JP-8	Active	12.5 million gallons
F-5	JP-8	Active	12.5 million gallons
F-6	JP-8	Active	12.5 million gallons
F-7	JP-5	Active	12.5 million gallons
F-8	JP-5	Active	12.5 million gallons
F-9	JP-5	Active	12.5 million gallons
F-10	JP-5	Active	12.5 million gallons
F-11	JP-5	Active	12.5 million gallons
F-12	JP-5	Active	12.5 million gallons
F-13	F-76	Active	12.5 million gallons
F-14	F-76	Active	12.5 million gallons
F-15	F-76	Active	12.5 million gallons
F-16	F-76	Active	12.5 million gallons
F-17	JP-5	Active	12.5 million gallons
F-18	JP-5	Active	12.5 million gallons
F-19	None	Inactive	12.5 million gallons
F-20	JP-5	Active	12.5 million gallons

F-76 Marine Diesel Fuel
JP-5 Jet Fuel Propellant-5
JP-8 Jet Fuel Propellant-8

1.2 PHYSICAL SETTING

Climatological conditions in the area of the RHSF consist of warm to moderate temperatures and low to moderate rainfall. The RHSF is leeward of the prevailing northeasterly trade winds. The average annual precipitation is approximately 40 inches, which occurs mainly between November and April (State of Hawaii Department of Land and Natural Resources [DLNR], 1986). Annual pan evaporation is approximately 75 inches (DLNR, 1985). Average temperatures range from the low 60's to high 80's (degrees Fahrenheit) (Atlas of Hawaii, 1983).

Oahu consists of the eroded remnants of two shield volcanoes, Waianae and Koolau. The RHSF is located on the southwest flank of the Koolau volcanic shield. Lavas erupted during the shield-building phase of the volcano belong to the *Koolau Volcanic Series* (Stearns and Vaksvik, 1935). Following formation of the Koolau shield, a long period of volcanic quiescence occurred, during which the shield was deeply eroded. Following this erosional period, eruptive activity resumed. Lavas and pyroclastic material erupted during this period belong to the *Honolulu*

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Volcanic Series (Stearns and Vaksvik, 1935).

In the immediate area of the RHSF, Koolau Volcanic Series lavas dominate, although there are consolidated and unconsolidated non-calcareous deposits in the vicinity that consist of alluvium generated during erosion of the Koolau volcanic shield. South-southwest of the RHSF, and in isolated exposures to the west, are pyroclastic deposits formed during eruptions from three Honolulu Volcanic Series vents, Salt Lake, Aliamanu, and Makalapa (Stearns and Vaksvik, 1935). Based on established geology and records of wells drilled at the RHSF (Stearns and Vaksvik, 1938), the RHSF is underlain by Koolau Volcanic Series basalts. The area of the RHSF is classified as *Rock Land*, where 25-90% of the land surface is covered by exposed rock and there are only shallow soils (Foote, et al., 1972).

Groundwater in Hawaii exists in two principal aquifer types. The first and most important type, in terms of drinking water resources, is the basal aquifer. The basal aquifer exists as a lens of fresh water floating on and displacing seawater within the pore spaces, fractures, and voids of the basalt that forms the underlying mass of each Hawaiian island. In parts of Oahu, groundwater in the basal aquifer is confined by the overlying caprock and is under pressure. Waters that flow freely to the surface from wells that tap the basal aquifer are referred to as *artesian*.

The second type of aquifer is the caprock aquifer, which consists of various kinds of unconfined and semi-confined groundwater. Commonly, the caprock consists of a thick sequence of nearly impermeable clays, coral, and basalt, that separates the caprock aquifer from the basal aquifer. The impermeable nature of these materials and the artesian nature of the basal aquifer severely restrict the downward migration of groundwater from the upper caprock aquifer. However, in the area of the RHSF, there is no discernible caprock.

Groundwater in the area of the RHSF is part of the *Waimalu Aquifer System* of the *Pearl Harbor Aquifer Sector*. The aquifer is classified as a basal, unconfined, flank-type; and is currently used as a drinking water source. The aquifer is considered fresh, with less than 250 milligrams per liter of chloride, and is considered an irreplaceable resource with a high vulnerability to contamination (Mink and Lau, 1990).

The nearest drinking water supply well is DON Well 2254-01, located in the infiltration gallery within the RHSF lower tunnel. The DON Well 2254-01 is located approximately 2,400 feet hydraulically and topographically downgradient of the USTs (Figure 2).

1.3 BACKGROUND

The RHSF was constructed by the U.S. Government in the early 1940s. Twenty USTs and a series of tunnels were constructed. The USTs were constructed of steel, and in the past have stored DON special fuel oil, DON distillate, aviation gasoline, and motor gasoline (Environet, 2010). The tanks currently contain JP-5, JP-8, and F-76. The fueling system is a self-contained underground unit that was installed into native rock comprised primarily of basalt with some

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interbedded tuffs and breccias (Environet, 2010). Each UST measures approximately 250 feet in height and 100 feet in diameter. The upper domes of the tanks lie at a depth varying between 100 feet and 200 feet below ground surface [bgs].

In 1998, Earth Tech conducted a Phase II Remedial Investigation/Feasibility Study for the Oily Waste Disposal Facility located within the RHSF. The study included the installation of well OWDFMW01 (which was originally MW08) (Earth Tech, 1999).

In February 2001, the DON installed groundwater monitoring well RHMW01 to monitor for contamination in the basal aquifer beneath the RHSF. Well RHMW01 was installed approximately 100 feet below grade within the lower access tunnel. The depth to water was measured at 86 feet below the tunnel floor at the time of the well completion. In February 2001, a groundwater sample was collected from the well. TPH and total lead were detected in the sample. Total lead was detected at a concentration above the DOH Tier 1 groundwater action level of 5.6 µg/L (The Environmental Company, Inc. [TEC], 2009; DOH, 2000).

In 2005, the RHSF groundwater monitoring program was initiated. It involved routine groundwater sampling of well RHMW01 and sampling point RHMW2254-01. Samples were collected in February, June, September, and December of 2005. Lead was detected at concentrations above the DOH Tier 1 action level of 5.6 µg/L in samples collected in February and June. The samples collected in February and June were not filtered prior to analysis, whereas the samples collected in September and December were filtered prior to analysis. Since the samples collected in February and June were not filtered prior to analysis, the lead results were not considered appropriate for a risk assessment (TEC, 2008).

Between June and September 2005, TEC installed three additional groundwater monitoring wells (wells RHMW02, RHMW03, and RHMW04) (TEC, 2008). Well RHMW04 was installed hydraulically upgradient of the USTs to provide background geochemistry information for water moving through the basal aquifer beneath the RHSF. Wells RHMW02 and RHMW03 were installed approximately 125 feet below grade within the RHSF lower tunnel and well RHMW04 was installed to a depth of approximately 300 feet bgs outside of the RHSF tunnels. In September 2005, groundwater samples were collected from the three newly installed groundwater monitoring wells (wells RHMW02, RHMW03, and RHMW04) along with the existing well RHMW01 and sampling point RHMW2254-01. The contaminants of potential concern [COPCs] with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs.
- **RHMW02** – TPH-g, TPH-d, naphthalene, trichloroethylene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs.

In 2006, TEC installed dedicated sampling pumps in the four wells (wells RHWM01, RHWM02, RHMW03, and RHWM04) and one sampling point (RHMW2254-01). In July and December of

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2006, groundwater samples were collected from the four wells and the sampling point. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d and naphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW02** – TPH-g, TPH-d, and naphthalene were detected at concentrations above their respective DOH EAL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs.

In 2007, SSRBLs were established for TPH (4,500 µg/L) and benzene (750 µg/L) based on the solubility in water of JP-5 and JP-8 (TEC, 2007). Groundwater samples were collected from wells RHWM01, RHWM02, and RHMW03, and sampling point RHMW2254-01. Samples were collected in March, June, and September of 2007. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-g, TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.

In 2008, groundwater samples were collected from wells RHWM01, RHWM02, and RHMW03, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October of 2008. The COPCs with concentrations exceeding current DOH EALs are summarized below. In addition, a groundwater protection plan (TEC, 2008) was prepared.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations detected in October 2008 were also above the SSRBL.
- **RHMW03** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.

In April 2009, groundwater monitoring well RHMW05 was installed downgradient of the USTs, within the lower access tunnel between RHMW01 and RHMW2254-01. It was installed to identify the extent of contamination hydraulically downgradient of the USTs. Well RHMW05 was added to the quarterly groundwater sampling program. In 2009, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in February, May, July, and October of 2009. The

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COPCs with concentrations exceeding current DOH EALs are summarized below. In addition, the Groundwater Protection Plan was revised to include well RHMW05.

- **RHMW01** – TPH-d and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.
- **RHMW05** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.

In 2010, groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-g, TPH-d, naphthalene, and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.
- **RHMW03** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.
- **RHMW05** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.

In 2011, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. In a Fall 2011 update, the DOH EALs were revised. The drinking water toxicity EAL for TPH-d decreased from 210 to 190 µg/L (DOH, 2011). The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, naphthalene, indeno[1,2,3-cd]pyrene, and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In 2012, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in

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February, April, July, and November. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, TPH-g, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In 2013, quarterly groundwater samples were collected from wells RHWM01, RHWM02, RHMW03, and RHMW05, and sampling point RHMW2254-01. Samples were collected in January, April, July, and October. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d, TPH-g, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In January 2014, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and sampling point RHMW2254-01. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at a concentration above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d was detected at concentrations above both DOH EALs, and naphthalene and 1-methylnaphthalene were detected at concentrations above only the DOH EAL for drinking water toxicity. The TPH-d concentrations exceeded the SSRBL.

Between January and April 2014, additional groundwater sampling was conducted at wells RHMW01, RHMW02, RHMW05, and sampling point RHMW2254-01 in response to a reported release from Tank 5. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW01** – TPH-d was detected at concentrations above the DOH EALs, but below the SSRBL.
- **RHMW02** – TPH-d was detected at concentrations above both DOH EALs, and naphthalene and 1-methylnaphthalene were detected at concentrations above only the DOH EAL for drinking water toxicity. The TPH-d concentrations were below the SSRBL.

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In April 2014, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and sampling point RHMW2254-01. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW02** – TPH-d and naphthalene were detected at concentrations above both DOH EALs. 1-Methylnaphthalene was detected at concentrations above only the DOH EAL for drinking water toxicity. The TPH-d concentrations were below the SSRBL.

In May and June 2014, additional groundwater sampling was conducted at wells RHMW01, RHMW02, RHMW05, and sampling point RHMW2254-01 in response to a reported release from Tank 5. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW02** – TPH-d, naphthalene, and 1-methylnaphthalene were detected at concentrations above their respective DOH EAL. The TPH-d concentrations were below the SSRBL.

In July 2014, quarterly groundwater samples were collected from wells RHMW01, RHMW02, RHMW03, RHMW05, and sampling point RHMW2254-01. The COPCs with concentrations exceeding current DOH EALs are summarized below.

- **RHMW02** – TPH-d, 1-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EAL. 2-Methylnaphthalene was detected at concentrations above only the DOH EAL for gross contamination. The TPH-d concentrations were below the SSRBL.

1.3.1 Previous Reports

The following groundwater monitoring reports were previously submitted to the DOH:

1. Groundwater Sampling Report, First Quarter 2005 (submitted April 2005).
2. Groundwater Sampling Report, Second Quarter 2005 (submitted August 2005).
3. Groundwater Sampling Report, Third Quarter 2005 (submitted November 2005).
4. Groundwater Sampling Report, Fourth Quarter 2005 (submitted February 2006).
5. Groundwater Monitoring Results, July 2006 (submitted September 2006).
6. Groundwater Monitoring Results, December 2006 (submitted January 2007).
7. Groundwater Monitoring Results, March 2007 (submitted May 2007).
8. Groundwater Monitoring Results, June 2007 (submitted August 2007).
9. Groundwater Monitoring Results, September 2007 (submitted October 2007).
10. Groundwater Monitoring Report, January 2008 (submitted March 2008).
11. Groundwater Monitoring Report, April 2008 (submitted May 2008).

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12. Groundwater Monitoring Report, July 2008 (submitted October 2008).
13. Groundwater Monitoring Report, October and December 2008 (submitted February 2009).
14. Groundwater Monitoring Report, February 2009 (submitted May 2009).
15. Groundwater Monitoring Report, May 2009 (submitted July 2009).
16. Groundwater Monitoring Report, July 2009 (submitted September 2009).
17. Groundwater Monitoring Report, October 2009 (submitted December 2009).
18. Groundwater Monitoring Report, January, February, and March 2010 (submitted April 2010).
19. Groundwater Monitoring Report, April 2010 (submitted May 2010).
20. Groundwater Monitoring Report, July 2010 (submitted August 2010).
21. Groundwater Monitoring Report, October 2010 (submitted December 2010).
22. Groundwater Monitoring Report, January 2011 (submitted March 2011).
23. Groundwater Monitoring Report, April 2011 (submitted June 2011).
24. Groundwater Monitoring Report, July 2011 (submitted September 2011).
25. Groundwater Monitoring Report, October 2011 (submitted December 2011).
26. Groundwater Monitoring Report, January-February 2012 (submitted March 2012).
27. Groundwater Monitoring Report, April 2012 (Submitted July 2012).
28. Groundwater Monitoring Report, October 2012 (Submitted January 2013).
29. Groundwater Monitoring Report, January 2013 (Submitted April 2013).
30. Groundwater Monitoring Report, April 2013 (Submitted July 2013).
31. Groundwater Monitoring Report, July 2013 (Submitted September 2013).
32. Groundwater Monitoring Report, October 2013 (Submitted January 2014).
33. Groundwater Sampling Report for Additional Sampling, January 2014 (submitted January 2014).
34. Groundwater Monitoring Report, January 2014 (Submitted April 2014).
35. Groundwater Sampling Report for Tank 5 Release Response on March 5 and 6, 2014 (submitted March 2014).
36. Groundwater Sampling Report for Tank 5 Release Response on March 10, 2014 (submitted March 2014).
37. Groundwater Sampling Report for Tank 5 Release Response on March 25 and 26, 2014 (submitted April 2014).

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38. Groundwater Sampling Report for Tank 5 Release Response on April 7, 2014 (submitted April 2014).

39. Groundwater Monitoring Report, April 2014 (Submitted June 2014).

40. Groundwater Sampling Report for Tank 5 Release Response on May 27 and 28, 2014 (submitted June 2014).

41. Groundwater Sampling Report for Tank 5 Release Response on June 23 and 24, 2014 (submitted July 2014).

42. Groundwater Monitoring Report, July 2014 (Submitted September 2014).

SECTION 2 – GROUNDWATER SAMPLING

On October 27 and 28, 2014, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01). The samples were collected in accordance with the 2012 WP/SAP. The WP/SAP is consistent with DOH UST release response requirements (DOH, 2000); DON Procedure I-C-3, *Monitoring Well Sampling* (DON, 2007); and the RHSF Groundwater Protection Plan (TEC, 2008). Prior to purging and sampling, the depth to groundwater and the depth to the bottoms of the wells were measured using a Geotech oil/water interface probe. No measurable product, sheen, or petroleum hydrocarbon odor was detected in any of the wells.

2.1 GROUNDWATER SAMPLING

Prior to collecting groundwater samples, the monitoring wells were purged of standing water in the well casings. Each well contains a dedicated bladder pump which was used to purge the well and to collect samples. To operate the pump, a portable air compressor with an in-line filter was connected to a QED MP50 MicroPurge® Basics Controller box, which was then connected to the pump. The compressor was turned on to power the pump and the controller was used to adjust the pumping rate to less than one liter of water per minute.

Water quality parameters were monitored on a periodic basis during well purging. The water quality parameters that were measured included hydrogen activity [pH], temperature, conductivity, dissolved oxygen, and oxidation reduction potential. The water quality parameters were evaluated to assess whether the natural characteristics of the aquifer formation water were present within the monitoring wells before collecting the samples. At least four readings were collected during the purging process. Purging was considered complete when at least three consecutive water quality measurements stabilized within approximately 10%. The readings were recorded on groundwater monitoring logs. The groundwater monitoring logs are included in Appendix A. In addition, field notes were taken to document the sampling event. The field notes are included in Appendix B.

When the water quality parameters stabilized, groundwater samples were collected from the wells using the bladder pumps. The groundwater samples were collected no more than two hours after purging was completed to decrease groundwater interaction with the monitoring well casing and atmosphere. Prior to collecting the sample, the water level in the monitoring wells was measured and recorded to ensure that excessive drawn down had not occurred. The groundwater samples were collected at flow rates of approximately 0.17 to 0.5 liters per minute. Samples collected for dissolved lead analysis were filtered in the field using new, 0.45-micron filters.

All samples were labeled and logged on the Sample Inventory Log, placed in Ziploc™ bags and sealed, custody sealed, sealed with tape, placed in a cooler with wet ice, and logged onto the Chain-of-Custody form. The samples were labeled and logged in accordance with Project

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Procedures Manual Standard Operating Procedure III-E, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures* (DON, 2007). All samples were shipped under Chain-of-Custody to the analytical laboratory and analyzed for the COPCs as described in Section 2.2.

2.2 Analytical Results

The samples were analyzed for TPH-d using U.S. Environmental Protection Agency [EPA] Method 8015M, TPH-g and Volatile Organic Compounds [VOCs] using EPA Method 8260B, PAHs using EPA Method 8270C SIM, dissolved lead using EPA Method 6020, and total lead using EPA Method 200.8. The sample collected from sampling point RHMW2254-01 was analyzed for total lead (unfiltered) as DON Well 2254-01 is a drinking water supply well. A copy of the laboratory report is included as Appendix C.

Analytical results were compared to the DOH EALs for drinking water toxicity and gross contamination. Analytical results for wells RHMW01, RHMW02, RHMW03, and RHMW05 were also compared to the SSRBLs for TPH (4,500 µg/L) and benzene (750 µg/L), established in the RHSF Final Groundwater Protection Plan (TEC, 2008). The results of the fourth quarter groundwater sampling event are summarized in Table 2.1 and described below.

- **RHMW01** – TPH-d (120 µg/L) and lead (0.0976 µg/L) were the only analytes detected. The TPH-d concentration exceeded the DOH EAL for gross contamination, but was below the SSRBL of 4,500 µg/L for TPH. None of the other chemical constituents analyzed for were detected at concentrations above their respective DOH EAL.
- **RHMW02** – TPH-d (2,000 µg/L), TPH-g (57 and 53 µg/L), xylenes (0.32 and 0.29 µg/L), acenaphthene (0.53 µg/L), ethylbenzene (0.15 and 0.14 µg/L), 1-methylnaphthalene (59 and 54 µg/L), 2-methylnaphthalene (43 and 36 µg/L), and naphthalene (140 and 130 µg/L) were detected in both the primary and duplicate samples collected. Lead (0.165 µg/L) was only detected in the duplicate sample. TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EALs for both drinking water toxicity and gross contamination. However, the TPH-d concentrations did not exceed the SSRBL.
- **RHMW03** – TPH-d (80 µg/L) was the only analyte detected. The concentration did not exceed the DOH EAL or the SSRBL.
- **RHMW05** – TPH-d (16 µg/L) was the only analyte detected. The concentration did not exceed the DOH EAL or the SSRBL.
- **RHMW2254-01** – TPH-d (22 µg/L) and total lead (0.211 µg/L) were the only analytes detected. The concentrations did not exceed their respective DOH EAL.

2.3 Groundwater Contaminant Trends

The historical groundwater contaminant concentrations for COPCs that exceeded the DOH EALs or SSRBLs are illustrated in Appendix D. A table of cumulative historical groundwater

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results is included as Appendix E. A summary of groundwater contaminant trends is provided below.

- **RHMW01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW01. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations have shown an overall decreasing trend from a high of 1,500 µg/L in February 2005. The TPH-d concentration exceeded the DOH EAL for gross contamination for the first time since April 7, 2014.
- **RHMW02** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW02. TPH-g, TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. During the October 2014 event, concentrations of TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene approximately doubled from the previous event in July 2014 and remained above DOH EALs. The concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene increased to their highest levels in over 5 years. The concentrations of these PAHs are also significantly higher than they were in January 2014, when a high TPH-d spike was observed in this well. The concentrations of TPH-g remained below the DOH EALs for gross contamination and drinking water toxicity and were comparable to the concentrations detected during the previous event. Trichloroethylene was detected once in RHMW02 in September 2005 in the primary sample at a concentration above the DOH EAL for drinking water toxicity; however, trichloroethylene was not detected in the duplicate sample, and this may have been an anomalous result.
- **RHMW03** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW03. TPH-d has historically been detected at concentrations above the DOH EALs; however, it has not been detected at concentrations above the DOH EALs since October 2010.
- **RHMW05** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW05. TPH-d has historically been detected in RHMW05 at concentrations above the DOH EAL for both drinking water toxicity and gross contamination; however, it has not been detected at concentrations above the DOH EALs since January 2010.
- **RHMW2254-01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW2254-01. Although the method reporting limits for TPH-d exceeded one or both DOH EALs for drinking water toxicity and gross contamination between May 2009 and July 2010, TPH-d was last detected in RHMW2254-01 at a concentration above the DOH EAL for gross contamination in January 2008.

2.4 WASTE DISPOSAL

The purged groundwater and decontamination water generated during sampling of the inside tunnel was placed in a 55-gallon drum along with the purged water and decontamination water from the outside tunnel wells. The drum is currently stored onsite at ADIT 3 on top of a

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secondary containment spill pallet and covered by a tarp. There is a non-hazardous label affixed to the drum with all pertinent information relating to its generation. The drum will be used for future sampling events and will be properly disposed of once it has been filled.

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TABLE 2.1
Analytical Results for Groundwater Sampling (October 27 and 28, 2014)
Red Hill Bulk Fuel Storage Facility
October 2014 Quarterly Monitoring Report

Method	Chemical	DOH EALs		RHMW2254-01 (ES117)					RHWM01 (ES113)					RHMW02 (ES114)					RHWM03 (ES116)					RHMW05 (ES118)				
		Drinking Water Toxicity	Gross Contamination	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL	Results	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	22	HD,J	25	12	11	120	HD,J	25	12	11	2,000	HD,J	25	12	11	80	HD,J	25	12	11	16	HD,J	25	12	11
EPA 8260B	TPH-g	100	100	N.D.	U	50	30	26	N.D.	U	50	30	26	57		50	30	26	N.D.	U	50	30	26	N.D.	U	50	30	26
EPA 8270C	Acenaphthene	370	20	N.D.	U	0.19	0.049	0.026	N.D.	U	0.21	0.052	0.028	0.53		0.19	0.047	0.025	N.D.	U	0.21	0.054	0.029	N.D.	U	0.19	0.048	0.026
	Acenaphthylene	240	2,000	N.D.	U	0.19	0.049	0.043	N.D.	U	0.21	0.052	0.046	N.D.	U	0.19	0.047	0.042	N.D.	U	0.21	0.054	0.048	N.D.	U	0.19	0.048	0.043
	Anthracene	1,800	22	N.D.	U	0.19	0.049	0.028	N.D.	U	0.21	0.052	0.030	N.D.	U	0.19	0.047	0.027	N.D.	U	0.21	0.054	0.031	N.D.	U	0.19	0.048	0.028
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.19	0.049	0.032	N.D.	U	0.21	0.052	0.034	N.D.	U	0.19	0.047	0.031	N.D.	U	0.21	0.054	0.035	N.D.	U	0.19	0.048	0.031
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.19	0.097	0.080	N.D.	U	0.21	0.10	0.085	N.D.	U	0.19	0.095	0.078	N.D.	U	0.21	0.11	0.088	N.D.	U	0.19	0.096	0.079
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.19	0.049	0.022	N.D.	U	0.21	0.052	0.023	N.D.	U	0.19	0.047	0.021	N.D.	U	0.21	0.054	0.024	N.D.	U	0.19	0.048	0.021
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.19	0.049	0.017	N.D.	U	0.21	0.052	0.018	N.D.	U	0.19	0.047	0.017	N.D.	U	0.21	0.054	0.019	N.D.	U	0.19	0.048	0.017
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.19	0.049	0.030	N.D.	U	0.21	0.052	0.032	N.D.	U	0.19	0.047	0.029	N.D.	U	0.21	0.054	0.033	N.D.	U	0.19	0.048	0.030
	Chrysene	9.2	1	N.D.	U	0.19	0.049	0.024	N.D.	U	0.21	0.052	0.026	N.D.	U	0.19	0.047	0.024	N.D.	U	0.21	0.054	0.027	N.D.	U	0.19	0.048	0.024
	Dibenzo[a,h]anthracene[1]	0.0092	0.52	N.D.	U	0.19	0.049	0.046	N.D.	U	0.21	0.052	0.049	N.D.	U	0.19	0.047	0.045	N.D.	U	0.21	0.054	0.051	N.D.	U	0.19	0.048	0.046
	Fluoranthene	1,500	130	N.D.	U	0.19	0.049	0.045	N.D.	U	0.21	0.052	0.049	N.D.	U	0.19	0.047	0.044	N.D.	U	0.21	0.054	0.050	N.D.	U	0.19	0.048	0.045
	Fluorene	240	950	N.D.	U	0.19	0.049	0.041	N.D.	U	0.21	0.052	0.044	N.D.	U	0.19	0.047	0.040	N.D.	U	0.21	0.054	0.046	N.D.	U	0.19	0.048	0.041
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.19	0.049	0.021	N.D.	U	0.21	0.052	0.022	N.D.	U	0.19	0.047	0.020	N.D.	U	0.21	0.054	0.023	N.D.	U	0.19	0.048	0.020
	1-Methylnaphthalene	4.7	10	N.D.	U	0.19	0.097	0.050	N.D.	U	0.21	0.10	0.054	59		3.8	1.9	0.98	N.D.	U	0.21	0.011	0.055	N.D.	U	0.19	0.096	0.050
	2-Methylnaphthalene	24	10	N.D.	U	0.19	0.049	0.045	N.D.	U	0.21	0.052	0.048	43		3.8	0.95	0.88	N.D.	U	0.21	0.054	0.050	N.D.	U	0.19	0.048	0.045
	Naphthalene	17	21	N.D.	U	0.19	0.049	0.033	N.D.	U	0.21	0.052	0.035	140		3.8	0.95	0.64	N.D.	U	0.21	0.054	0.036	N.D.	U	0.19	0.048	0.033
	Phenanthrene	240	410	N.D.	U	0.19	0.049	0.026	N.D.	U	0.21	0.052	0.028	N.D.	U	0.19	0.047	0.026	N.D.	U	0.21	0.054	0.029	N.D.	U	0.19	0.048	0.026
	Pyrene	180	68	N.D.	U	0.19	0.049	0.020	N.D.	U	0.21	0.052	0.021	N.D.	U	0.19	0.047	0.019	N.D.	U	0.21	0.054	0.022	N.D.	U	0.19	0.048	0.020
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,1,2,2-Tetrachloroethane[1]	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane[1]	0.6	50,000	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane[1]	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2
	1,2-Dibromoethane[1]	0.04	50,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane[1]	0.15	7,000	N.D.	U	1	0.5	0.24	N.D.	U,IH	1	0.5	0.24	N.D.	U,IH	1	0.5	0.24	N.D.	U,IH	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)[1]	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	Acetone	22,000	20,000	N.D.	U,ICH	20	10	6	N.D.	U,ICH	20	10	6	N.D.	U,ICH	20	10	6	N.D.	U,ICH	20	10	6	N.D.	U,ICH	20	10	6
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Bromodichloromethane[1]	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46
	Chloromethane[1]	1.8	50,000	N.D.	U, IJ	10	2	1.8	N.D.	U, IJ	10	2	1.8	N.D.	U, IJ	10	2	1.8	N.D.	U, IJ	10	2	1.8	N.D.	U, IJ	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48
	Dibromochloromethane[1]	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	0.15	J	1	0.5	0.14	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U,ICH	10	5.0	2.2	N.D.	U	10	5.0	2.2
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	N.D.	U	11	1.5	0.23	N.D.	U	1	0.5	0.23	0.32	J	1	0.5	0.23	N.D.	U	1	0.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Dissolved Lead	15	50,000	-	-	-	-	-	0.0976	J	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898	N.D.	U	1	0.2	0.0898
EPA 200.8	Total Lead	15	50,000	0.211	J	1.0	-	0.0898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The data are in micrograms per liter (µg/L). Shaded values exceeded the DOH EALs.

[1] LOD for this analyte exceeds the DOH EAL

\- Not Analyzed

* This sample was analyzed by EPA Method 200.8 and therefore does not have an LOD

DL Detection Limit or Method Detection Limit (MDL)

DOH EALs DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).

EPA Environmental Protection Agency

HD The chromatographic pattern was inconsistent with the profile of the reference fuel standard.

ICH Initial calibration verification recovery is above the control limit for this analyte.

ICJ Initial calibration verification recovery is below the control limit for this analyte.

J Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.

LOD Limit of Detection

LOQ Limit of Quantitation

N.D. Not Detected

Q Qualifiers

TPH-d Total Petroleum Hydrocarbons as diesel

TPH-g Total Petroleum Hydrocarbons as gasoline

U Undetected at DL and is reported as less than the LOD.

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SECTION 3 – DATA QUALITY ASSESSMENT

A data quality assessment, which consists of a review of the overall groundwater sample collection and analysis process, was performed in order to determine whether the analytical data generated met the quality objectives for the project. The data quality assessment was performed in accordance with the approved WP/SAP (ESI, 2012). The field quality control program consisted of standardized sample collection and management procedures, and the collection of field duplicate samples, matrix spike samples, and trip blank samples. The laboratory quality assurance program consisted of the use of standard analytical methods and the preparation and analyses of Matrix Spike [MS]/Matrix Spike Duplicate [MSD] samples, surrogate spikes, blanks, and Laboratory Control Samples [LCSs]/Laboratory Control Sample Duplicates [LCSDs].

3.1 DATA VALIDATION AND ASSESSMENT

The objective of data validation is to provide data of known quality for project decisions. Data quality is judged in terms of Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity [PARCCS]. A number of factors may affect the quality of data, including: sample collection methods, sample analysis methods, and adherence to established procedures for sample collection, preservation, management, shipment, and analysis.

Precision

Precision is defined as the reproducibility of replicate measurements. Precision is evaluated by Relative Percentage Difference [RPD] of field duplicates, LCS/LCSD, and MS/MSD results. Field duplicate and MS/MSD samples were collected at a rate of approximately 10% of primary samples. Field duplicates were sent to the laboratory along with the primary samples.

The RPDs of detected analytes for the primary and field duplicate samples (ES114 and ES115) are provided in Table 3.1. A precision of less than 50% for duplicate pairs is required by the DON Project Procedures Manual to be considered acceptable (DON 2007). All duplicate RPDs are less than the acceptable maximum, except for lead. An RPD of 200% was assigned to the ES114 and ES115 (RHMW02) lead results because lead was detected in only one of the replicate samples from the duplicate pair. The lead result for sample ES115 was below the limit of quantitation [LOQ]; consequently, the RPD exceedance signified the anticipated decrease in precision below the LOQ, but was not indicative of a QC issue. Therefore, it is unlikely to have an effect on data usability. In addition, all RPDs for MS/MSD and LCS/LCSD pairs were also within the control limits, and the data precision is considered acceptable.

Accuracy

Accuracy is defined as the degree of conformity of a measurement to a standard or true value. Accuracy is evaluated through measurement of the percent recovery of an analyte in a reference standard or spiked sample. Accuracy limits for surrogates, laboratory control spike, MS, and MSD samples are either prescribed by the Department of Defense [DoD] or

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established by the individual laboratory. The acceptance criteria for accuracy are dependent on the analytical method and are based on historical laboratory or DoD data.

Between July 2006 and July 2010, naphthalene was analyzed for by both EPA Methods 8260B and 8270C, and both results were reported. In September 2005 and in all data beginning in October 2010, only results using EPA Method 8270C were reported. Naphthalene has historically only been detected at concentrations above the DOH EALs in well RHMW02. In this well, concentrations of naphthalene detected in each sample by EPA Method 8260B were generally two to three times higher than those detected by EPA Method 8270C. We assume this is due to the better preservation of VOCs associated with the use of EPA Method 8260B. This suggests that the naphthalene results provided by EPA Method 8270C may be biased low. Since March 2014, naphthalene concentrations in RHMW02 have exceeded DOH EALs for both gross contamination and drinking water toxicity. Therefore, a low bias is unlikely to affect project decisions.

Results for TPH-d in samples ES113 through ES118 were flagged "HD." The laboratory indicated a mismatch between the calibration standard and the TPH-d chromatographic profile. Mismatches of this type are not uncommon. Even though chromatograms are not part of the standard laboratory package, ESI was able to review the chromatograms from RHMW02 dating back to October 2012. The chromatograms of groundwater samples from RHMW02 did not significantly differ between each event, but did not match a standard chromatogram of JP-8 in groundwater.

The MS and MSD recoveries were above the control limits for TPH-d, and the associated sample results may be biased high. The TPH-d results from this sample delivery group (ES113 to ES116) have been flagged "J", estimated, to indicate the increased error caused by possible matrix interference. Naphthalene, 2-methylnaphthalene and 1-methylnaphthalene concentrations for ES114, the primary sample on which the MS/MSD were performed, were significantly higher than the added spike concentration, which prevented an accurate evaluation of the MS/MSD recovery for these analytes.

All other MS/MSD recoveries and all LCS and surrogate spike recoveries were within acceptable recovery limits; therefore, the data accuracy for this monitoring event is considered acceptable.

Representativeness

Representativeness is the degree that data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness was achieved by conducting sampling in accordance with the sample collection procedures described in the project WP/SAP, including standardized sample collection methods (ESI, 2012).

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Representativeness is also evaluated through the compliance with the standardized sample holding time and sample preservation methods, and through the analysis of blank samples, including method blank and trip blank samples. For this sampling event, all sample holding time and sample preservation were consistent with EPA guidance.

For this sampling event, one trip blank was included in every cooler containing samples for VOC and TPH-g analysis to assess the potential for contamination during sample transport. Two trip blanks were collected. 1,4-Dichlorobenzene was the only COPC detected, and in only one of the trip blanks at a concentration below the LOD; however, 1,4-dichlorobenzene was not detected in any of the groundwater samples, excluding the possibility that project samples were contaminated with 1,4-dichlorobenzene during handling or transport. Based on the assessment of representativeness, the groundwater sample data are considered representative of the groundwater quality on site. The trip blank results are provided in Table 3.1.

Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the analytical laboratory. No data were rejected for this project, and therefore the completeness goal for this project (90%), was successfully met.

Comparability

Comparability expresses the confidence with which one data set can be compared to another data set. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data with acceptable precision and accuracy are considered comparable if collection techniques, analytical procedures, methods and reporting are equivalent.

As noted above, between July 2006 and July 2010, naphthalene was analyzed for using both EPA Methods 8260B and 8270C, and in September 2005 and between October 2010 and the most recent event, only results using EPA Method 8270C were reported. In general, EPA Method 8260B resulted in higher, and as discussed above, likely more accurate, results than EPA Method 8270C. However, for the sake of comparability with results from recent events, EPA Method 8270C was used for naphthalene analysis in this event. Consequently, the low bias associated with Method 8270C should be considered when making project decisions.

All project samples for TPH-g analysis through July 2010 were analyzed by EPA Method 8015; beginning in October 2010, EPA Method 8260B was used. There was no event where both methods were used; consequently, there is no way to directly compare the results obtained by method and to assess potential bias. However, there is no reason to believe that using either method should bias the data, and the TPH-g data for all events should be comparable.

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Other than the naphthalene bias discussed above, no issues with comparability were identified. The results are considered comparable within this data set and with the data collected from recent sampling events.

Sensitivity

The LOQs are established by the laboratory based on the limits of detection [LODs] or instrument detection limits, historical data, and EPA limits established for the various methods. The LOQs for samples may require adjustment by the laboratory due to matrix interference or if high levels of target analytes necessitate dilution before analysis. Matrix interference and sample dilutions have the effect of decreasing sensitivity and increasing the LOQs. Laboratory LODs and LOQs for several analytes (EPA Methods 8260 and 8270) for this event differed from the LODs and LOQs in the WP/SAP because the laboratory updates them quarterly and in some cases, dilution was necessary due to the presence of high concentrations of analytes.

For this event, LODs and LOQs for several analytes were greater than the DOH EALs (as stated in the WP/SAP), and therefore it would not be possible to detect the analytes at concentrations greater than the DOH EALs but below the LODs. The lack of the required sensitivity should be considered when making project decisions. The affected analytes for this monitoring event are 1,2,3-trichloropropane, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, 1,2-dichloroethane, 1,3-dichloropropene, bromodichloromethane, chloromethane, dibromochloromethane, 1,1,2,2-tetrachloroethane, and dibenzo[a,h]anthracene.

3.2 Data Assessment and Usability Conclusions

The PARCCS criteria were evaluated, and with a few exceptions, all criteria were met. Based on the high MS/MSD recoveries for TPH-d, it is possible that sample results for TPH-d may be biased high. This increased error should be kept in mind when comparing TPH-d results from this sampling event to those of previous events, but should not significantly affect data usability. Other than this issue, the data assessment concludes that all data generated during this event are usable for the intended purpose.

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TABLE 3.1
Quality Control Results for Groundwater Sampling (October 27 and 28, 2014)
Red Hill Bulk Fuel Storage Facility
October 2014 Quarterly Monitoring Report

Method	Chemical Constituent	DOH EALs		RHMW02 (ES114)					RHMW02 (ES115) (DUP)					RPD Duplicate (%)	ES Trip (10/27/2014)					ES Trip (10/28/2014)				
		Drinking Water Toxicity	Gross Contamination	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL		Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL
EPA 8015B	TPH-d	190	100	2,000	HD,J	25	12	11	2,000	HD,J	25	12	11	0.00	-	-	-	-	-	-	-	-	-	-
EPA 8260B	TPH-g	100	100	57		50	30	26	53	J	50	30	26	7.27	N.D.	U	50	30	26	N.D.	U	50	30	26
EPA 8270C	Acenaphthene	370	20	0.53		0.19	0.047	0.025	0.53		0.19	0.047	0.025	0.00	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	240	2,000	N.D.	U	0.19	0.047	0.042	N.D.	U	0.19	0.047	0.042	NA	-	-	-	-	-	-	-	-	-	-
	Anthracene	1,800	22	N.D.	U	0.19	0.047	0.027	N.D.	U	0.19	0.047	0.027	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]anthracene	0.092	4.7	N.D.	U	0.19	0.047	0.031	N.D.	U	0.19	0.047	0.031	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[g,h,i]perylene	1,500	0.13	N.D.	U	0.19	0.095	0.078	N.D.	U	0.19	0.095	0.078	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[a]pyrene	0.2	0.81	N.D.	U	0.19	0.047	0.021	N.D.	U	0.19	0.047	0.021	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[b]fluoranthene	0.092	0.75	N.D.	U	0.19	0.047	0.017	N.D.	U	0.19	0.047	0.017	NA	-	-	-	-	-	-	-	-	-	-
	Benzo[k]fluoranthene	0.92	0.4	N.D.	U	0.19	0.047	0.029	N.D.	U	0.19	0.047	0.029	NA	-	-	-	-	-	-	-	-	-	-
	Chrysene	9.2	1	N.D.	U	0.19	0.047	0.024	N.D.	U	0.19	0.047	0.023	NA	-	-	-	-	-	-	-	-	-	-
	Dibenzo[a,h]anthracene	0.0092	0.52	N.D.	U	0.19	0.047	0.045	N.D.	U	0.19	0.047	0.045	NA	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	1,500	130	N.D.	U	0.19	0.047	0.044	N.D.	U	0.19	0.047	0.044	NA	-	-	-	-	-	-	-	-	-	-
	Fluorene	240	950	N.D.	U	0.19	0.047	0.040	N.D.	U	0.19	0.047	0.040	NA	-	-	-	-	-	-	-	-	-	-
	Indeno[1,2,3-cd]pyrene	0.092	0.095	N.D.	U	0.19	0.047	0.020	N.D.	U	0.19	0.047	0.020	NA	-	-	-	-	-	-	-	-	-	-
	1-Methylnaphthalene	4.7	10	59		3.8	1.9	0.98	54		3.8	1.9	0.98	8.85	-	-	-	-	-	-	-	-	-	-
	2-Methylnaphthalene	24	10	43		3.8	0.95	0.88	36		3.8	0.95	0.88	17.72	-	-	-	-	-	-	-	-	-	-
	Naphthalene	17	21	140		3.8	0.95	0.64	130		3.8	0.95	0.64	7.41	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	240	410	N.D.	U	0.19	0.047	0.026	N.D.	U	0.19	0.047	0.026	NA	-	-	-	-	-	-	-	-	-	-
	Pyrene	180	68	N.D.	U	0.19	0.047	0.019	N.D.	U	0.19	0.047	0.019	NA	-	-	-	-	-	-	-	-	-	-
EPA 8260B	1,1,1,2-Tetrachloroethane	0.52	50,000	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,1,2,2-Tetrachloroethane	0.067	500	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41	NA	N.D.	U	1	0.5	0.41	N.D.	U	1	0.5	0.41
	1,1,1-Trichloroethane	200	970	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3	NA	N.D.	U	5	0.5	0.3	N.D.	U	5	0.5	0.3
	1,1,2-Trichloroethane	5	50,000	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38	NA	N.D.	U	1	0.5	0.38	N.D.	U	1	0.5	0.38
	1,1-Dichloroethane	2.4	50,000	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28	NA	N.D.	U	5	0.5	0.28	N.D.	U	5	0.5	0.28
	1,1-Dichloroethylene	7	1,500	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43
	1,2,3-Trichloropropane	0.6	50,000	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64	NA	N.D.	U	5	1	0.64	N.D.	U	5	1	0.64
	1,2,4-Trichlorobenzene	70	3,000	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5	NA	N.D.	U	5	1	0.5	N.D.	U	5	1	0.5
	1,2-Dibromo-3- chloropropane	0.04	10	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2	NA	N.D.	U	10	2	1.2	N.D.	U	10	2	1.2
	1,2-Dibromoethane	0.04	50,000	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichlorobenzene	600	10	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46	NA	N.D.	U	1	0.5	0.46	N.D.	U	1	0.5	0.46
	1,2-Dichloroethane	0.15	7,000	N.D.	U,IH	1	0.5	0.24	N.D.	U,IH	1	0.5	0.24	NA	N.D.	U,IH	1	0.5	0.24	N.D.	U	1	0.5	0.24
	1,2-Dichloropropane	5	10	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42	NA	N.D.	U	5	0.5	0.42	N.D.	U	5	0.5	0.42
	1,3-Dichlorobenzene	180	5	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4	NA	N.D.	U	1	0.5	0.4	N.D.	U	1	0.5	0.4
	1,3-Dichloropropene (total of cis/trans)	0.43	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	1,4-Dichlorobenzene	75	5	N.D.	U	1	0.5	0.43	N.D.	U	1	0.5	0.43	NA	N.D.	U	1	0.5	0.43	0.43	U	1	0.5	0.43
	Acetone	22,000	20,000	N.D.	U,ICH	20	10	6	N.D.	U,IC	20	10	6	NA	N.D.	U,IC	20	10	6	N.D.	U,IC	20	10	6
	Benzene	5	170	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14	NA	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Bromodichloromethane	0.12	50,000	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21	NA	N.D.	U	5	0.5	0.21	N.D.	U	5	0.5	0.21
	Bromoform	80	510	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5	NA	N.D.	U	10	1	0.5	N.D.	U	10	1	0.5
	Bromomethane	8.7	50,000	N.D.	U	20	5	3.9	N.D.	U	20	5	3.9	NA	N.D.	U	20	5	3.9	N.D.	U,ICJ	20	5	3.9
	Carbon Tetrachloride	5	520	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23	NA	N.D.	U	1	0.5	0.23	N.D.	U	1	0.5	0.23
	Chlorobenzene	100	50	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17	NA	N.D.	U	5	0.5	0.17	N.D.	U	5	0.5	0.17
	Chloroethane	21,000	16	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3	NA	N.D.	U	10	5	2.3	N.D.	U	10	5	2.3
	Chloroform	70	2,400	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46	NA	N.D.	U	5	0.5	0.46	N.D.	U	5	0.5	0.46
	Chloromethane	1.8	50,000	N.D.	U, IJ	10	2	1.8	N.D.	U, IJ	10	2	1.8	NA	N.D.	U, IJ	10	2	1.8	N.D.	U	10	2	1.8
	cis-1,2-Dichloroethylene	70	50,000	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48	NA	N.D.	U	1	0.5	0.48	N.D.	U	1	0.5	0.48
	Dibromochloromethane	0.16	50,000	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25	NA	N.D.	U	1	0.5	0.25	N.D.	U	1	0.5	0.25
	Ethylbenzene	700	30	0.15	J	1	0.5	0.14	0.14	J	1	0.5	0.14	6.90	N.D.	U	1	0.5	0.14	N.D.	U	1	0.5	0.14
	Hexachlorobutadiene	0.86	6	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32	NA	N.D.	U	1	0.5	0.32	N.D.	U	1	0.5	0.32
	Methyl ethyl ketone (2-Butanone)	7,100	8,400	N.D.	U,ICH	10	5.0	2.2	N.D.	U,IC	10	5.0	2.2	NA	N.D.	U,IC	10	5.0	2.2	N.D.	U	10	5.0	2.2
	Methyl isobutyl ketone (4-Methyl-2-Pentanone)	2,000	1300	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4	NA	N.D.	U	10	5.0	4.4	N.D.	U	10	5.0	4.4
	Methyl tert-butyl Ether	12	5	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31	NA	N.D.	U	1	0.5	0.31	N.D.	U	1	0.5	0.31
	Methylene chloride	4.8	9,100	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64	NA	N.D.	U	5	1.0	0.64	N.D.	U	5	1.0	0.64
	Styrene	100	10	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17	NA	N.D.	U	1	0.5	0.17	N.D.	U	1	0.5	0.17
	Tetrachloroethylene	5	170	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39	NA	N.D.	U	5	0.5	0.39	N.D.	U	5	0.5	0.39
	Toluene	1,000	40	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24	NA	N.D.	U	1	0.5	0.24	N.D.	U	1	0.5	0.24
	trans-1,2- Dichloroethylene	100	260	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Trichloroethylene	5	310	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37	NA	N.D.	U	1	0.5	0.37	N.D.	U	1	0.5	0.37
	Vinyl chloride	2	3,400	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3	NA	N.D.	U	1	0.5	0.3	N.D.	U	1	0.5	0.3
	Xylenes	10,000	20	0.32	J	1	0.5	0.23	0.29	J	1	0.5	0.23	9.84	N.D.	U	11	1.5	0.23	N.D.	U	11	1.5	0.23
EPA 6020	Lead	15	50,000	N.D.	U	1	0.2	0.0898	0.165	J	1	0.2	0.0898	200	-	-	-	-	-	-	-	-	-	-

The data are in micrograms per liter (µg/L). Shaded values exceeded the DOH EALs.

- Not Analyzed
DOH EALs DOH Tier 1 Environmental Action Levels for groundwater where groundwater is a current drinking water source and surface water is greater than 150 meters from the site (DOH, Fall 2011).
DL Detection Limit or Method Detection Limit (MDL)
EPA Environmental Protection Agency
HD The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH Initial calibration verification recovery is above the control limit for this analyte.
ICJ Initial calibration verification recovery is below the control limit for this analyte.
J Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
LOD Limit of Detection
LOQ Limit of Quantitation
NA Both results for duplicate pair were non-detect, no RPD calculations
N.D. Not Detected
Q Qualifiers
TPH-g Total Petroleum Hydrocarbons as gasoline
TPH-d Total Petroleum Hydrocarbons as diesel
U Undetected at DL and is reported as less than the LOD.

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SECTION 4 – SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

On October 27 and 28, 2014, ESI personnel collected groundwater samples from four monitoring wells at the RHSF (wells RHMW01, RHMW02, RHMW03, and RHMW05) and one sampling point at Red Hill Shaft (RHMW2254-01).

The groundwater sampling was conducted as part of the long-term groundwater and soil vapor monitoring program at the RHSF, under NAVFAC Contract Number N62742-12-D-1853. The sampling was conducted in accordance with the approved WP/SAP prepared by ESI. A summary of the analytical results is provided below.

- **RHMW01** – TPH-d (120 µg/L) and lead (0.0976 µg/L) were the only analytes detected. The TPH-d concentration exceeded the DOH EAL for gross contamination, but was below the SSRBL of 4,500 µg/L for TPH. None of the other chemical constituents analyzed for were detected at concentrations above their respective DOH EAL.
- **RHMW02** – TPH-d (2,000 µg/L), TPH-g (57 and 53 µg/L), xylenes (0.32 and 0.29 µg/L), acenaphthene (0.53 µg/L), ethylbenzene (0.15 and 0.14 µg/L), 1-methylnaphthalene (59 and 54 µg/L), 2-methylnaphthalene (43 and 36 µg/L), and naphthalene (140 and 130 µg/L) were detected in both the primary and duplicate samples collected. Lead (0.165 µg/L) was only detected in the duplicate sample. TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene were detected at concentrations above their respective DOH EALs for both drinking water toxicity and gross contamination. However, the TPH-d concentrations did not exceed the SSRBL.
- **RHMW03** – TPH-d (80 µg/L) was the only analyte detected. The concentration did not exceed the DOH EAL or the SSRBL.
- **RHMW05** – TPH-d (16 µg/L) was the only analyte detected. The concentration did not exceed the DOH EAL or the SSRBL.
- **RHMW2254-01** – TPH-d (22 µg/L) and total lead (0.211 µg/L) were the only analytes detected. The concentrations did not exceed their respective DOH EAL.

Groundwater Contaminant Trends

- **RHMW01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW01. TPH-d has historically been detected at concentrations above the DOH EAL for both drinking water toxicity and gross contamination. TPH-d concentrations have shown an overall decreasing trend from a high of 1,500 µg/L in February 2005. The TPH-d concentration exceeded the DOH EAL for gross contamination for the first time since April 7, 2014.
- **RHMW02** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW02. TPH-g, TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene have historically been detected at concentrations above the DOH EALs. During the October 2014 event, concentrations of TPH-d, 1-methylnaphthalene,

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2-methylnaphthalene, and naphthalene approximately doubled from the previous event in July 2014 and remained above DOH EALs. The concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene increased to their highest levels in over 5 years. The concentrations of these PAHs are also significantly higher than they were in January 2014, when a high TPH-d spike was observed in this well. The concentrations of TPH-g remained below the DOH EALs for gross contamination and drinking water toxicity and were comparable to the concentrations detected during the previous event.

- **RHMW03** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW03. TPH-d has historically been detected at concentrations above the DOH EALs; however, it has not been detected at concentrations above the DOH EALs since October 2010.
- **RHMW05** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW05. TPH-d has historically been detected in RHMW05 at concentrations above the DOH EAL for both drinking water toxicity and gross contamination; however, it has not been detected at concentrations above the DOH EALs since January 2010.
- **RHMW2254-01** – COPCs detected during this round of quarterly sampling are consistent with the historical data for RHMW2254-01. Although the method reporting limits for TPH-d exceeded one or both DOH EALs for drinking water toxicity and gross contamination between May 2009 and July 2010, TPH-d was last detected in RHMW2254-01 at a concentration above the DOH EAL for gross contamination in January 2008.

Conclusions and Recommendations

During the sampling event conducted on October 27 and 28, 2014, TPH-d in RHMW01 and TPH-d, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 were detected at concentrations exceeding the DOH EALs. Groundwater contaminant concentrations in wells RHMW03, RHMW05, and RHMW2254-01 remained at low concentrations and did not change significantly from the previous event, or were not detected.

Concentrations of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in RHMW02 have shown an increasing trend since March 5, 2014, but have remained below the historic maximums detected in the well. All other analytical results were generally consistent with historical data.

Based on the groundwater monitoring results and the reported release at Tank 5 in January 2014, continued groundwater monitoring at the wells inside the RHSF tunnel is recommended. The next quarterly event is tentatively scheduled for January 2015.

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SECTION 5 – FUTURE WORK

Future work includes the first quarter 2015 groundwater monitoring which is tentatively scheduled for January 2015. A quarterly groundwater monitoring report will be prepared to document the sampling event.

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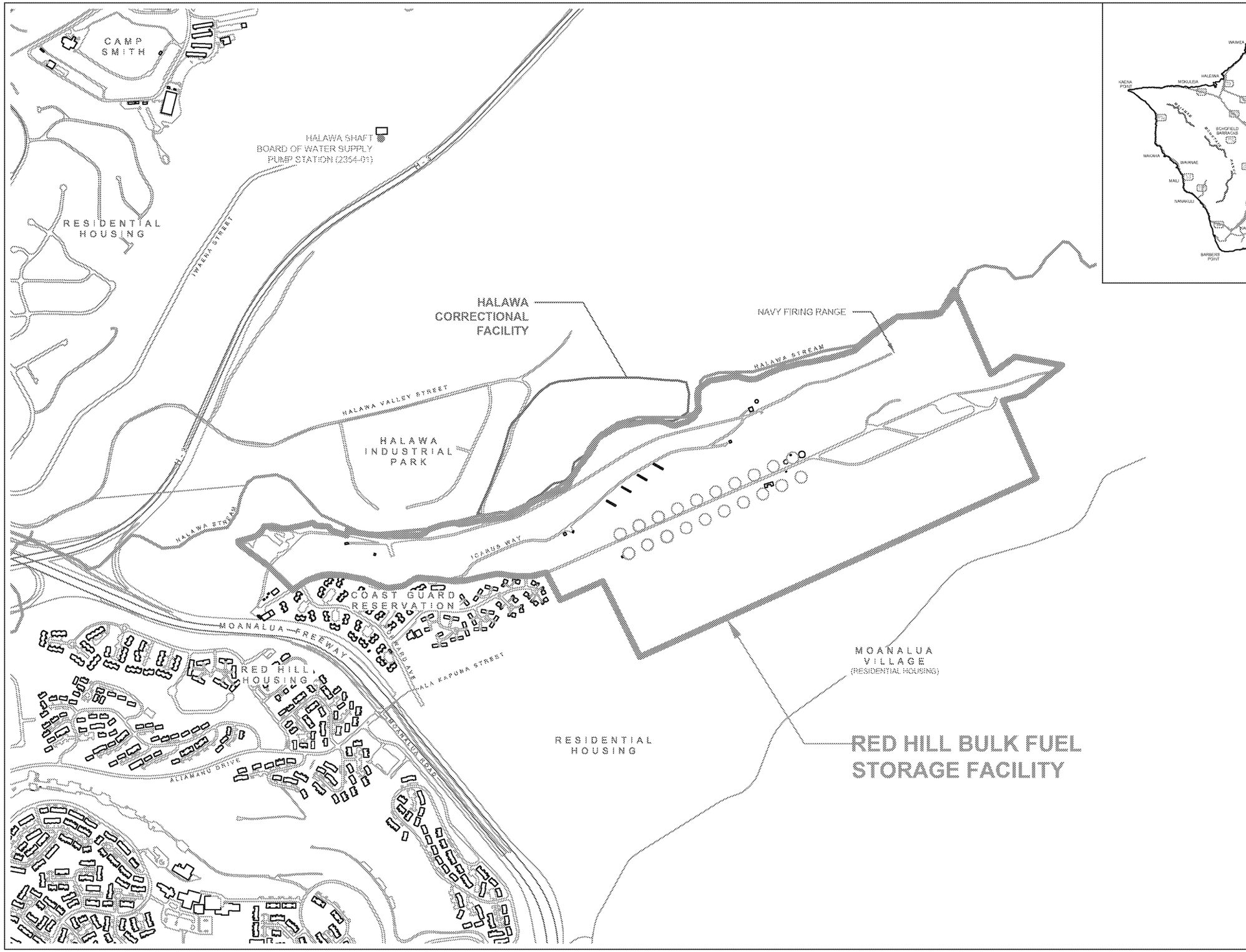

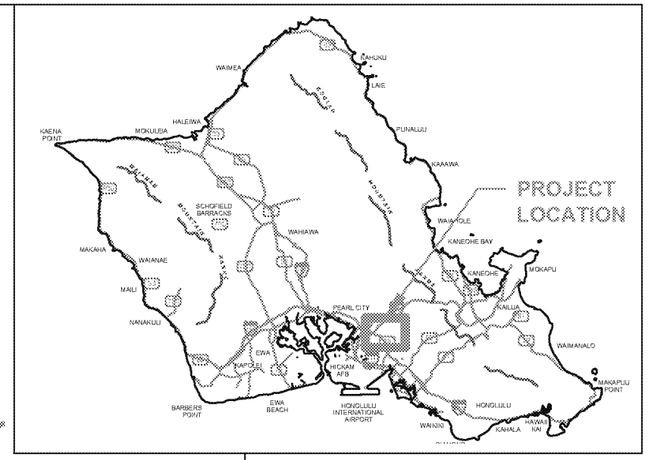

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

900 0 900

Scale in Feet

FIGURE 1

SITE LOCATION

GROUNDWATER MONITORING
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII

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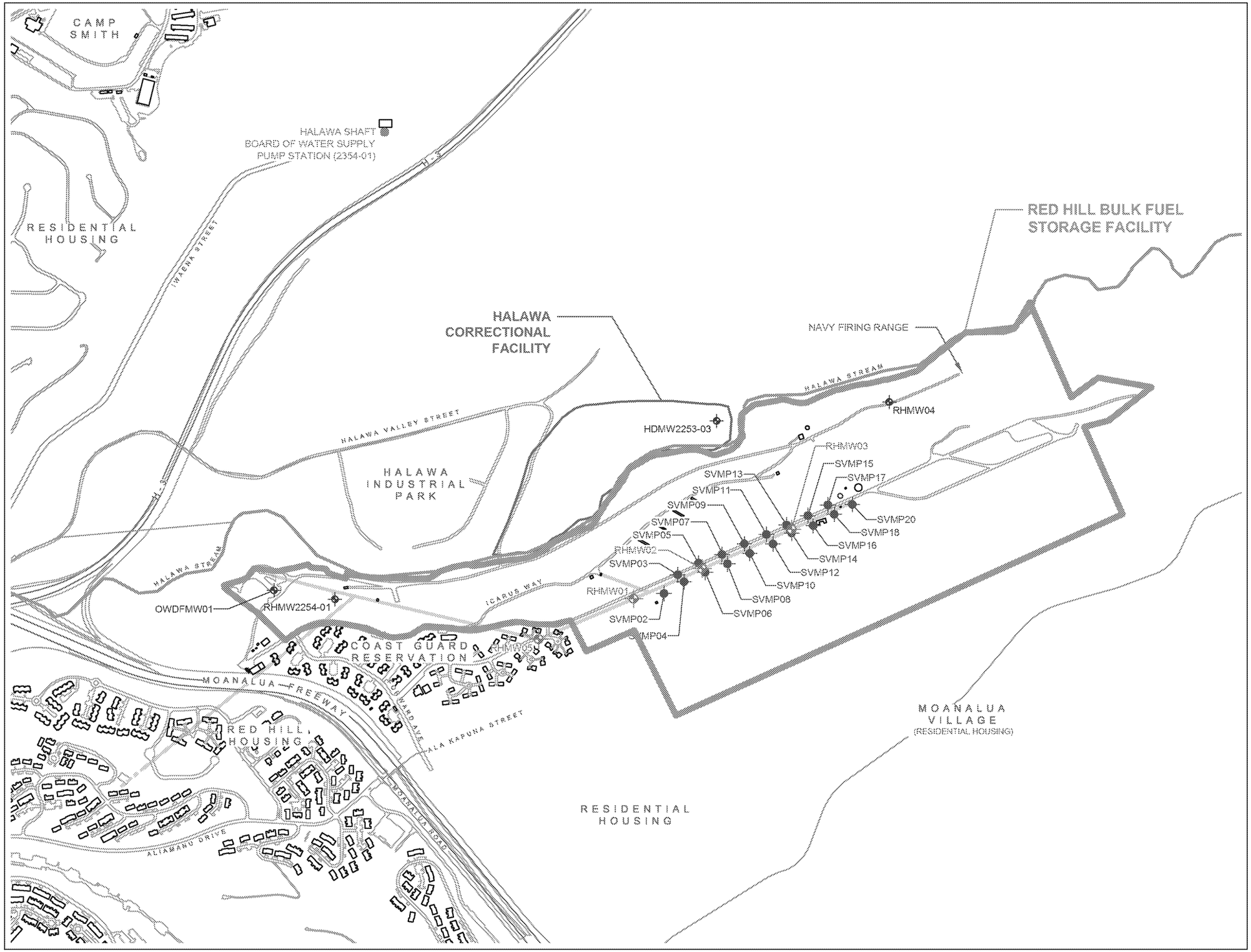

LEGEND

- RED HILL BULK FUEL STORAGE FACILITY
- HALAWA CORRECTIONAL FACILITY
- HALAWA STREAM
- BUILDING
- ROAD
- ABOVEGROUND STORAGE TANK
- WATER TANK
- SOIL VAPOR MONITORING POINT
- GROUNDWATER MONITORING WELL LOCATED INSIDE TUNNEL
- GROUNDWATER MONITORING WELL LOCATED OUTSIDE TUNNEL
- BOARD OF WATER SUPPLY PUMP STATION
- TUNNEL

NOTES

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SOURCES

Pearl Harbor Base Map

Navy GIS files

NORTH

GRAPHIC SCALE

800 0 800

Scale in Feet

FIGURE 2

SITE LAYOUT

GROUNDWATER MONITORING
RED HILL BULK FUEL STORAGE FACILITY
NAVAL SUPPLY SYSTEM COMMAND (NAVSUP)
FLEET LOGISTICS CENTER
JBPHH, OAHU, HAWAII

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APPENDIX A

Groundwater Sampling Logs

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Groundwater Sampling Log

Well ID: RHMW01 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 83.79 ft Date: 10/27/2014 Time: 1300

Total Depth of Well: 97.35 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 13.56 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 3.5 L Method of Removal: Bladder Pump

Water Level After Purging: 83.79 ft Pumping Rate: 0.19 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1315	0.0 L	8.40	0.342	11.41	25.25	-	-247.8
1318	0.5 L	8.39	0.340	2.43	24.88	-	-289.0
1322	1.0 L	8.38	0.339	1.64	24.23	-	-312.0
1325	1.5 L	8.38	0.335	0.34	23.55	-	-346.0
1327	2.0 L	8.37	0.335	-0.07	23.41	-	-345.0
1329	2.5 L	8.35	0.334	-0.06	23.37	-	-342.1
1331	3.0 L	8.36	0.334	-0.07	23.36	-	-341.2
1333	3.5 L	8.36	0.332	-0.07	23.34	-	-339.6

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES113 [0400]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/27/2014 Time: 1530

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

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Groundwater Sampling Log

Well ID: RHMW02 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 86.51 ft Date: 10/27/2014 Time: 1011

Total Depth of Well: 92.91 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 6.40 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 4.0 L Method of Removal: Bladder Pump

Water Level After Purging: 86.45 ft Pumping Rate: 0.17 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1029	0.0 L	8.40	0.373	2.40	25.17	-	291
1035	1.0 L	8.41	0.575	1.30	24.26	-	298
1040	2.0 L	8.40	0.551	0.97	24.13	-	-352.4
1045	3.0 L	8.39	0.560	0.82	24.21	-	-349.7
1053	4.0 L	8.35	0.567	0.84	24.25	-	-361.3

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 16 - 40ml VOAs, 6 - 1L amber jar, 4 - 500ml amber jar, 4 - 500ml HDPE

Sample Identification Numbers: ES114 [1045], ES114 MS/MSD [1045], ES115 (Dup) [1115]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by:

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/27/2014 Time: 1530

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

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Groundwater Sampling Log

Well ID: RHMW03 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 102.78 ft Date: 10/27/2014 Time: 820

Total Depth of Well: 110.12 ft Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: 7.34 ft Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 3.0 L Method of Removal: Bladder Pump

Water Level After Purging: 102.88 ft Pumping Rate: 0.2 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
830	0.0 L	7.52	0.823	2.14	26.10	-	-206.0
834	1.0 L	7.56	0.820	0.95	26.40	-	-240.1
840	2.0 L	7.63	0.821	0.87	26.40	-	-233.1
845	3.0 L	7.58	0.816	0.71	26.41	-	-238.6

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Low

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 250ml HDPE

Sample Identification Numbers: ES116 [0900]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/27/2014 Time: 1530

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

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Groundwater Sampling Log

Well ID: RHMW05 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 83.21 ft Date: 10/28/2014 Time: 1013

Total Depth of Well: Unable to Measure Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: Unknown Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 3.0 L Method of Removal: Bladder Pump

Water Level After Purging: 83.21 ft Pumping Rate: 0.23 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1405	0.0 L	9.20	0.889	8.83	22.91	-	-211.6
1410	1.0 L	9.61	0.888	8.69	22.87	-	-210.8
1413	2.0 L	9.22	0.886	8.68	22.87	-	-210.4
1418	3.0 L	9.20	0.886	8.67	22.85	-	-209.1

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Clear

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 6020

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 1L HDPE

Sample Identification Numbers: ES118 [1430]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/28/2014 Time: 1530

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

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Groundwater Sampling Log

Well ID: RHMW2254-01 Location: Red Hill Bulk Fuel Storage Facility Project No.: 112066

Initial Water Level: 83.44 ft Date: 10/28/2014 Time: 1110

Total Depth of Well: Not applicable Personnel Involved: Kirk Markle, Jeff Hattemer

Length of Saturated Zone: Not applicable Weather Conditions: Not applicable – well is located indoors

Volume of Water to be Removed: 5.0 L Method of Removal: Bladder Pump

Water Level After Purging: 83.44 ft Pumping Rate: 0.50 L/min

Well Purge Data:

Time	Volume Removed	pH	Conductivity (mS/cm)	DO (mg/l)	Temperature	Salinity	Redox (ORP) (mV)
1117	0.0 L	9.60	0.613	13.00	21.97	-	-201.7
1119	1.0 L	9.55	0.606	10.29	21.59	-	-200.3
1121	2.0 L	9.65	0.603	9.57	21.45	-	-197.5
1123	3.0 L	9.47	0.603	9.43	21.38	-	-196.2
1125	4.0 L	9.44	0.603	9.23	21.28	-	-195.0
1127	5.0 L	9.43	0.603	9.17	21.28	-	-193.7

Sample Withdrawal Method: Bladder Pump

Appearance of Sample:

Color: Clear

Turbidity: Clear

Sediment: None

Other: None

Laboratory Analysis Parameters and Preservatives: TPH-d - 8015; TPH-g, VOCs - 8260; PAHs - 8270c sim; lead - 200.8

Number and Types of Sample Containers: 6 - 40ml VOAs, 2 - 1L amber jar, 1 - 500ml amber jar, 1 - 1L HDPE

Sample Identification Numbers: ES117 [1200]

Decontamination Procedures: Triple Rinsed

Notes: YSI did not have salinity parameter.

Sampled by: Kirk Markle, Jeff Hattemer

Sampled Delivered to: Calscience Environmental Lab Transporters: FedEx

Date: 10/28/2014 Time: 1530

Capacity of Casing (Gallons/Linear Feet)

2"-0.16• 4"-0.65 • 8"-2.61 • 10"-4.08 • 12"-5.87

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APPENDIX B

Field Notes

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Location RHSF

Date 9/25/14

Project / Client NAVFAC

Purpose: SV monitoring, FP monitoring
Personnel: JH, KM
0843 @ Red Hill. Safety meeting
Calibrate PID
☆ All notes on Field Forms
1500 Depart Red Hill.

☆ Tank 14 being vented.
No petroleum odor noted
in lower tunnel.

JH
9/25/14

73

Location RHSF

Date 10/20/14

Project / Client NAVFAC

Purpose: SV monitoring, GW sampling
Personnel: JH, KM
0800 Arrive @ Red Hill. Calibrate
PID. Safety meeting
1030 Open RHMW01
DTW:
Set up pump.
Pump controller not discharging
Unable to purge well.
Set up @ RHMW02.
Pump controller still not
discharging.
Depart tunnel, will bring
other controllers tomorrow.

JH
10/20/14

ED_006532_00009894-00063

Location RHSF Date 10/20/14
Project / Client NAVFAC

0912	Purge	SVMP02		
S	200	131	191	204
M	109	97	53	109
D	144	91	75	144

0929	Purge	SVMP03		
S	649	740	788	800
M	Pump	stopped	working	
D				

Purge SVMP04

Purge SVMP05

Purge SVMP06

Purge SVMP07

Location RHSF Date 10/21/14
Project / Client NAVFAC

Purpose GW sampling
0800 @ Red Hill safety meeting.
0845 @ RHMW2254-01
set up to pump.
Controller not discharging
Try controller w/ dedicated pump. Water not coming up tube. Try backup controller. Doesn't power on.
1200 Leave RHMW2254-01.
Unable to collect sample.
Will return Thursday @ 0945.
Depart Red Hill to buy fittings for pump.
1445 Try to sample RHMW5
but controller not works
1530 Depart Red Hill

SH
10/21/14

ED_006532_00009894-00064

76

Location RHSF Date 10/22/14

Project / Client NAVFAC

Purpose: GW sampling
Personnel: JH, KM
0815 @ Red Hill. Safety meeting
0825 Meet Patrick from DLNR
0835 Enter Halawa
0850 Gauge RHBW2253-03
DTW = 207.99
0900 Add Trip Blank 1
0945 Collected sample ES120
1000 Depart Halawa
Gauge ow
DTW =
1050 Collected ES121, ES121MS/MSD, and ES1222 (dup @ 1130)
1120 Heavy rain falling
Done packing samples
1230 break for lunch
1300 Enter tunnel and set up @ RHMW03.
Only able to get a small trickle of water out of wall.
1520 Depart tunnel and take samples to Fed Ex.

JH / 11/1/14

Location RHSF Date 10/27/14

Project / Client NAVFAC

Purpose: GW sampling, SV sampling
Personnel: JH, KM
0730 @ Red Hill - Safety meeting.
Calibrate PID
Enter tunnel.
Set up @ RHMW03
0820 @ DTW = 102.78
0845 Purged 3 L.
0900 Collected sample ES116.
Set up @ RHMW02
1011 DTW: 86.51
Purged 4 L
1045 Collected sample ES114, ES114/MSD and ES115 (dye @ 1115).
Set up @ RHMW01
1300 DTW: 83.79
1333 Purged 3.5 L
1400 Collected sample ES113
Depart tunnel.
1500 Done packing samples and cleaning up. Head to Fed Ex. and
1530 Drop off samples. Lunch
1600 Back to office.

JH 10/27/14

ED_006532_00009894-00065

78

Location RHSF Date 10/27/14

Project / Client NAVFAC

0844 SV16

S	0	0	0	0	0
M	0	0	0	0	0
D	0	0	0	0	0

0900 SUMP 15

S	0	0	0	0	0
M	blocked	no	sample		
D	0	0	0	0	0

0911 SUMP 14

S	0	0	0	0	0
M	129	112	122	129	123
D	122	153	81	153	127

0928 SUMP 13

S	116	145	167	167	149
M	105	139	167	167	145
D	191	197	215	215	205

1005 SUMP 12

S	81	68	78	81	77
M	133	143	150	150	144
D	40	95	92	95	81

1022 SUMP 11

M	85	170	180	180	154
D	Deep	Blanket.	NP	sample	BC

Location RHSF Date 10/27/14 79

Project / Client NAVFAC

1031 SUMP 10

					62
S	13	88	58	88	47
M					
D	109	126	112	126	95

1043 SUMP 09

S	78	92	105	105	95
M	95	146	122	146	125
D	163	187	194	194	183

1108 SUMP 06

S	197	235	279	279	248
M	1081	1163	1269	1269	1196
D	85	105	163	163	129

1124 SUMP 07

S	266	320	327	327	310
M	156	197	242	242	209
D	549	522	539	545	540

JH 10/27/14

ED_006532_00009894-00066

Location RHSF Date 10/28/14

Project / Client NAVFAC

Purpose: GW sampling
Personnel = JU, KA
0750 @ Red Hill. Safety meeting
0825 Enter tunnel to go to Adit 3 pump house
0830 @ Pump house. Nobody there to meet us
0850 Call Darren he will try calling Rodney. Go to pick up hydrogen tanks.
1030 Ken @ Adit 3 to let us into pump house
1100 Set up @ RHMW2254.01.

1200 Collected sample ES117
1245 Lunch
1245 Re-enter tunnel to
1400 sample RHMW05
1400 Collected Sample ES118
1500 Depart tunnel and take samples to Fed Ex

Location RHSF Date 10/28/14

Project / Client NAVFAC

1330 SUMP 17					
S	155	188	209	209	190
M	113	193	257	257	263
D	248	254	278	278	257
1349 SUMP 18					
S	1240	2031	2367	2367	2091
D	1576	1992	2232	2234	2058
1403 SUMP 20					
S	197	290	323	323	253
M	143	218	236	236	208
D	164	206	236	236	241

KA
10/28/14

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APPENDIX C

Laboratory Reports

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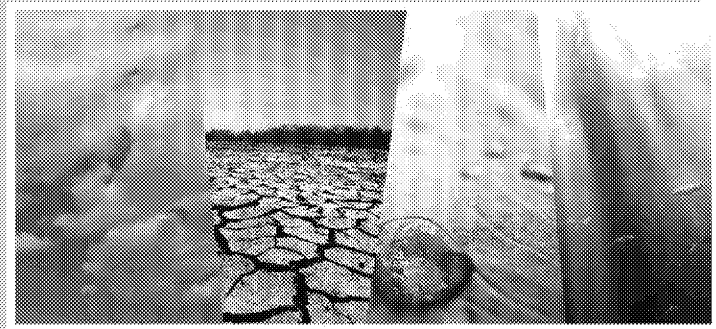
WORK ORDER NUMBER: 14-10-2131

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

Attention: Jeff Hattemer
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 11/04/2014 by:
Richard Villafania
Project Manager

ResultLink ▸

Email your PM ▸

nelac

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 14-10-2131

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Work Order Narrative

Work Order: 14-10-2131 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/28/14. They were assigned to Work Order 14-10-2131.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES113	**14-10-2131-2-H**	**10/27/14 14:00**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 09:41**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	120	11	12	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	91	51-141	

ES114	**14-10-2131-3-H**	**10/27/14 10:45**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 09:59**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	2000	11	12	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	92	51-141	

ES115	**14-10-2131-4-H**	**10/27/14 11:15**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 10:41**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	2000	11	12	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	91	51-141	

ES116	**14-10-2131-5-H**	**10/27/14 09:00**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 10:58**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	80	11	12	25	1.00	HD

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	65	51-141	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-516-206**	**N/A**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:03**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<12	11	12	25	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	117	51-141	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES113	**14-10-2131-2-G**	**10/27/14 14:00**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:36**	**141029L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	0.0976	0.0898	0.200	1.00	1.00	J

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES114	**14-10-2131-3-G**	**10/27/14 10:45**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:32**	**141029L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	1.00	1.00	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES115	**14-10-2131-4-G**	**10/27/14 11:15**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:39**	**141029L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	0.165	0.0898	0.200	1.00	1.00	J

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES116	**14-10-2131-5-G**	**10/27/14 09:00**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:43**	**141029L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	1.00	1.00	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-497-101**	**N/A**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 22:58**	**141029L03D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	1.00	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES113	**14-10-2131-2-I**	**10/27/14 14:00**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 20:19**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.052	0.035	0.052	0.21	1.00	U
2-Methylnaphthalene	<0.052	0.048	0.052	0.21	1.00	U
1-Methylnaphthalene	<0.10	0.054	0.10	0.21	1.00	U
Acenaphthylene	<0.052	0.046	0.052	0.21	1.00	U
Acenaphthene	<0.052	0.028	0.052	0.21	1.00	U
Fluorene	<0.052	0.044	0.052	0.21	1.00	U
Phenanthrene	<0.052	0.028	0.052	0.21	1.00	U
Anthracene	<0.052	0.030	0.052	0.21	1.00	U
Fluoranthene	<0.052	0.049	0.052	0.21	1.00	U
Pyrene	<0.052	0.021	0.052	0.21	1.00	U
Benzo (a) Anthracene	<0.052	0.034	0.052	0.21	1.00	U
Chrysene	<0.052	0.026	0.052	0.21	1.00	U
Benzo (k) Fluoranthene	<0.052	0.032	0.052	0.21	1.00	U
Benzo (b) Fluoranthene	<0.052	0.018	0.052	0.21	1.00	U
Benzo (a) Pyrene	<0.052	0.023	0.052	0.21	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.052	0.022	0.052	0.21	1.00	U
Dibenz (a,h) Anthracene	<0.052	0.049	0.052	0.21	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.085	0.10	0.21	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	49	28-139	
2-Fluorobiphenyl	65	33-144	
p-Terphenyl-d14	70	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES114	**14-10-2131-3-J**	**10/27/14 10:45**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 19:10**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acenaphthylene	<0.047	0.042	0.047	0.19	1.00	U
Acenaphthene	0.53	0.025	0.047	0.19	1.00	
Fluorene	<0.047	0.040	0.047	0.19	1.00	U
Phenanthrene	<0.047	0.026	0.047	0.19	1.00	U
Anthracene	<0.047	0.027	0.047	0.19	1.00	U
Fluoranthene	<0.047	0.044	0.047	0.19	1.00	U
Pyrene	<0.047	0.019	0.047	0.19	1.00	U
Benzo (a) Anthracene	<0.047	0.031	0.047	0.19	1.00	U
Chrysene	<0.047	0.024	0.047	0.19	1.00	U
Benzo (k) Fluoranthene	<0.047	0.029	0.047	0.19	1.00	U
Benzo (b) Fluoranthene	<0.047	0.017	0.047	0.19	1.00	U
Benzo (a) Pyrene	<0.047	0.021	0.047	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.047	0.020	0.047	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.047	0.045	0.047	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.095	0.078	0.095	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	66	28-139	
2-Fluorobiphenyl	65	33-144	
p-Terphenyl-d14	68	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES114	**14-10-2131-3-J**	**10/27/14 10:45**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 18:28**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	140	0.64	0.95	3.8	20.0	
2-Methylnaphthalene	43	0.88	0.95	3.8	20.0	
1-Methylnaphthalene	59	0.98	1.9	3.8	20.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	60	28-139	
2-Fluorobiphenyl	80	33-144	
p-Terphenyl-d14	83	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES115	**14-10-2131-4-I**	**10/27/14 11:15**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 19:33**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acenaphthylene	<0.047	0.042	0.047	0.19	1.00	U
Acenaphthene	0.53	0.025	0.047	0.19	1.00	
Fluorene	<0.047	0.040	0.047	0.19	1.00	U
Phenanthrene	<0.047	0.026	0.047	0.19	1.00	U
Anthracene	<0.047	0.027	0.047	0.19	1.00	U
Fluoranthene	<0.047	0.044	0.047	0.19	1.00	U
Pyrene	<0.047	0.019	0.047	0.19	1.00	U
Benzo (a) Anthracene	<0.047	0.031	0.047	0.19	1.00	U
Chrysene	<0.047	0.023	0.047	0.19	1.00	U
Benzo (k) Fluoranthene	<0.047	0.029	0.047	0.19	1.00	U
Benzo (b) Fluoranthene	<0.047	0.017	0.047	0.19	1.00	U
Benzo (a) Pyrene	<0.047	0.021	0.047	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.047	0.020	0.047	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.047	0.045	0.047	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.095	0.077	0.095	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	70	28-139	
2-Fluorobiphenyl	69	33-144	
p-Terphenyl-d14	73	23-160	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES115	**14-10-2131-4-I**	**10/27/14 11:15**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 18:52**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	130	0.64	0.95	3.8	20.0	
2-Methylnaphthalene	36	0.88	0.95	3.8	20.0	
1-Methylnaphthalene	54	0.98	1.9	3.8	20.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	53	28-139	
2-Fluorobiphenyl	78	33-144	
p-Terphenyl-d14	80	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 4 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES116	**14-10-2131-5-I**	**10/27/14 09:00**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 19:56**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.054	0.036	0.054	0.21	1.00	U
2-Methylnaphthalene	<0.054	0.050	0.054	0.21	1.00	U
1-Methylnaphthalene	<0.11	0.055	0.11	0.21	1.00	U
Acenaphthylene	<0.054	0.048	0.054	0.21	1.00	U
Acenaphthene	<0.054	0.029	0.054	0.21	1.00	U
Fluorene	<0.054	0.046	0.054	0.21	1.00	U
Phenanthrene	<0.054	0.029	0.054	0.21	1.00	U
Anthracene	<0.054	0.031	0.054	0.21	1.00	U
Fluoranthene	<0.054	0.050	0.054	0.21	1.00	U
Pyrene	<0.054	0.022	0.054	0.21	1.00	U
Benzo (a) Anthracene	<0.054	0.035	0.054	0.21	1.00	U
Chrysene	<0.054	0.027	0.054	0.21	1.00	U
Benzo (k) Fluoranthene	<0.054	0.033	0.054	0.21	1.00	U
Benzo (b) Fluoranthene	<0.054	0.019	0.054	0.21	1.00	U
Benzo (a) Pyrene	<0.054	0.024	0.054	0.21	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.054	0.023	0.054	0.21	1.00	U
Dibenz (a,h) Anthracene	<0.054	0.051	0.054	0.21	1.00	U
Benzo (g,h,i) Perylene	<0.11	0.088	0.11	0.21	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	59	28-139	
2-Fluorobiphenyl	67	33-144	
p-Terphenyl-d14	74	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 5 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-148-67**	**N/A**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 17:17**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.050	0.034	0.050	0.20	1.00	U
2-Methylnaphthalene	<0.050	0.046	0.050	0.20	1.00	U
1-Methylnaphthalene	<0.10	0.052	0.10	0.20	1.00	U
Acenaphthylene	<0.050	0.045	0.050	0.20	1.00	U
Acenaphthene	<0.050	0.027	0.050	0.20	1.00	U
Fluorene	<0.050	0.043	0.050	0.20	1.00	U
Phenanthrene	<0.050	0.027	0.050	0.20	1.00	U
Anthracene	<0.050	0.029	0.050	0.20	1.00	U
Fluoranthene	<0.050	0.047	0.050	0.20	1.00	U
Pyrene	<0.050	0.020	0.050	0.20	1.00	U
Benzo (a) Anthracene	<0.050	0.033	0.050	0.20	1.00	U
Chrysene	<0.050	0.025	0.050	0.20	1.00	U
Benzo (k) Fluoranthene	<0.050	0.031	0.050	0.20	1.00	U
Benzo (b) Fluoranthene	<0.050	0.018	0.050	0.20	1.00	U
Benzo (a) Pyrene	<0.050	0.022	0.050	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.021	0.050	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.050	0.048	0.050	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.082	0.10	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	53	28-139	
2-Fluorobiphenyl	68	33-144	
p-Terphenyl-d14	72	23-160	

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES TRIP	**14-10-2131-1-A**	**10/27/14 08:30**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 05:23**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U,ICH
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U,IJ
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U,IH
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	99	80-126	
1,2-Dichloroethane-d4	101	80-134	
Toluene-d8	100	80-120	
Toluene-d8-TPPH	99	88-112	
1,4-Bromofluorobenzene	94	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 12

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES113	**14-10-2131-2-A**	**10/27/14 14:00**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 06:18**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U,ICH
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U,IJ
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U,IH
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	95	80-126	
1,2-Dichloroethane-d4	97	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	95	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 5 of 12

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES114	**14-10-2131-3-A**	**10/27/14 10:45**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 05:51**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U,ICH
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U,IJ
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U,IH
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	0.15	0.14	0.50	1.0	1.00	J
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	0.32	0.23	0.50	1.0	1.00	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	57	26	30	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	98	80-126	
1,2-Dichloroethane-d4	100	80-134	
Toluene-d8	98	80-120	
Toluene-d8-TPPH	97	88-112	
1,4-Bromofluorobenzene	98	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 7 of 12

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES115	**14-10-2131-4-A**	**10/27/14 11:15**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 06:45**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U,ICH
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U,IJ
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U,IH
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	0.14	0.14	0.50	1.0	1.00	J
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	0.29	0.23	0.50	1.0	1.00	J
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	53	26	30	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	96	80-126	
1,2-Dichloroethane-d4	97	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	96	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 9 of 12

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES116	**14-10-2131-5-A**	**10/27/14 09:00**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 07:13**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U,ICH
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U,IJ
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U,IH
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	95	80-126	
1,2-Dichloroethane-d4	98	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	98	88-112	
1,4-Bromofluorobenzene	95	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 11 of 12

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-13-057-71**	**N/A**	**Aqueous**	**GC/MS OO**	**10/28/14**	**10/29/14 04:56**	**141028L046**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/28/14
Work Order: 14-10-2131
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	98	80-126	
1,2-Dichloroethane-d4	101	80-134	
Toluene-d8	100	80-120	
Toluene-d8-TPPH	100	88-112	
1,4-Bromofluorobenzene	95	80-120	

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	10/28/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2131
Kailua, HI 96734-2500	Preparation:	EPA 3510C
	Method:	EPA 8015B (M)
Project: Red Hill LTM 112066		Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES114	**Sample**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 09:59**	**141030S06**
ES114	**Matrix Spike**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 09:05**	**141030S06**
ES114	**Matrix Spike Duplicate**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 09:23**	**141030S06**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2046	2000	7915	293	7994	297	55-133	1	0-30	3

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	10/28/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2131
Kailua, HI 96734-2500	Preparation:	EPA 3005A Filt.
	Method:	EPA 6020
Project: Red Hill LTM 112066		Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES114	**Sample**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:32**	**141029S03B**
ES114	**Matrix Spike**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:05**	**141029S03B**
ES114	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:19**	**141029S03B**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	112.2	112	112.7	113	80-120	0	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES114	**Sample**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 18:28**	**141030S08**
ES114	**Matrix Spike**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 18:04**	**141030S08**
ES114	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 18:27**	**141030S08**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	143.3	2.000	83.89	0	78.94	0	21-133	6	0-25	3
2-Methylnaphthalene	42.74	2.000	34.71	0	32.01	0	21-140	8	0-25	3
1-Methylnaphthalene	59.00	2.000	47.61	0	45.00	0	20-140	6	0-25	3
Acenaphthylene	ND	2.000	1.706	85	1.549	77	33-145	10	0-25	
Acenaphthene	0.5300	2.000	2.109	79	1.970	72	49-121	7	0-25	
Fluorene	ND	2.000	1.860	93	1.701	85	59-121	9	0-25	
Phenanthrene	ND	2.000	1.624	81	1.459	73	54-120	11	0-25	
Anthracene	ND	2.000	1.548	77	1.417	71	27-133	9	0-25	
Fluoranthene	ND	2.000	1.666	83	1.524	76	26-137	9	0-25	
Pyrene	ND	2.000	1.581	79	1.473	74	18-168	7	0-25	
Benzo (a) Anthracene	ND	2.000	1.551	78	1.422	71	33-143	9	0-25	
Chrysene	ND	2.000	1.540	77	1.402	70	17-168	9	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.447	72	1.319	66	24-159	9	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.372	69	1.248	62	24-159	9	0-25	
Benzo (a) Pyrene	ND	2.000	1.331	67	1.216	61	17-163	9	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.320	66	1.166	58	10-171	12	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.422	71	1.275	64	10-219	11	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.524	76	1.373	69	10-227	10	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES114	Sample	Aqueous	GC/MS OO	10/28/14	10/29/14 05:51	141028S037
ES114	Matrix Spike	Aqueous	GC/MS OO	10/28/14	10/29/14 07:40	141028S037
ES114	Matrix Spike Duplicate	Aqueous	GC/MS OO	10/28/14	10/29/14 08:07	141028S037

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	55.96	112	59.02	118	40-140	5	0-20	
Benzene	ND	50.00	48.83	98	47.07	94	80-120	4	0-20	
Bromodichloromethane	ND	50.00	48.14	96	47.21	94	75-120	2	0-20	
Bromoform	ND	50.00	46.72	93	46.10	92	70-130	1	0-20	
Bromomethane	ND	50.00	47.90	96	42.68	85	30-145	12	0-20	
2-Butanone	ND	50.00	49.72	99	54.71	109	30-150	10	0-20	
Carbon Tetrachloride	ND	50.00	41.49	83	41.52	83	65-140	0	0-20	
Chlorobenzene	ND	50.00	49.02	98	47.13	94	80-120	4	0-20	
Chloroethane	ND	50.00	48.97	98	46.89	94	60-135	4	0-20	
Chloroform	ND	50.00	48.66	97	47.25	94	65-135	3	0-20	
Chloromethane	ND	50.00	42.58	85	42.98	86	40-125	1	0-20	
Dibromochloromethane	ND	50.00	49.94	100	48.76	98	60-135	2	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	42.13	84	42.15	84	50-130	0	0-20	
1,2-Dibromoethane	ND	50.00	50.33	101	49.09	98	80-120	2	0-20	
1,2-Dichlorobenzene	ND	50.00	47.77	96	46.40	93	70-120	3	0-20	
1,3-Dichlorobenzene	ND	50.00	47.15	94	45.84	92	75-125	3	0-20	
1,4-Dichlorobenzene	ND	50.00	46.75	94	45.19	90	75-125	3	0-20	
1,1-Dichloroethane	ND	50.00	45.35	91	44.62	89	70-135	2	0-20	
1,2-Dichloroethane	ND	50.00	54.76	110	52.87	106	70-130	4	0-20	
1,1-Dichloroethene	ND	50.00	46.83	94	46.17	92	70-130	1	0-20	
c-1,2-Dichloroethene	ND	50.00	48.30	97	47.53	95	70-125	2	0-20	
t-1,2-Dichloroethene	ND	50.00	46.93	94	46.11	92	60-140	2	0-20	
1,2-Dichloropropane	ND	50.00	47.05	94	46.05	92	75-125	2	0-20	
c-1,3-Dichloropropene	ND	50.00	43.96	88	43.95	88	70-130	0	0-20	
t-1,3-Dichloropropene	ND	50.00	37.58	75	38.14	76	55-140	1	0-20	
Ethylbenzene	ND	50.00	48.57	97	46.29	93	75-125	5	0-20	
Methylene Chloride	ND	50.00	46.74	93	46.27	93	55-140	1	0-20	
4-Methyl-2-Pentanone	ND	50.00	45.66	91	46.54	93	60-135	2	0-20	
Styrene	ND	50.00	49.11	98	47.51	95	65-135	3	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	46.10	92	45.50	91	80-130	1	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	48.52	97	47.00	94	65-130	3	0-20	
Tetrachloroethene	ND	50.00	53.01	106	50.86	102	45-150	4	0-20	
Toluene	ND	50.00	48.79	98	47.39	95	75-120	3	0-20	
1,2,4-Trichlorobenzene	ND	50.00	47.10	94	46.48	93	65-135	1	0-20	
1,1,1-Trichloroethane	ND	50.00	43.81	88	43.80	88	65-130	0	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	10/28/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2131
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066		Page 5 of 5

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Hexachloro-1,3-Butadiene	ND	50.00	47.57	95	45.21	90	50-140	5	0-20	
1,1,2-Trichloroethane	ND	50.00	47.82	96	46.98	94	75-125	2	0-20	
Trichloroethene	ND	50.00	47.24	94	44.84	90	70-125	5	0-20	
1,2,3-Trichloropropane	ND	50.00	50.56	101	49.71	99	75-125	2	0-20	
Vinyl Chloride	ND	50.00	51.75	103	51.09	102	50-145	1	0-20	
p/m-Xylene	ND	100.0	96.07	96	92.12	92	75-130	4	0-20	
o-Xylene	ND	50.00	49.17	98	47.56	95	80-120	3	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	40.87	82	42.14	84	65-125	3	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES114	**Sample**	**Aqueous**	**ICP/MS 04**	**10/29/14 00:00**	**10/30/14 23:32**	**141029S03B**
ES114	**PDS**	**Aqueous**	**ICP/MS 04**	**10/29/14 00:00**	**10/30/14 23:22**	**141029S03B**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	106.6	107	75-125	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-206	**LCS**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:20**	**141030B06**
099-15-516-206	**LCSD**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:37**	**141030B06**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2000	2296	115	2219	111	60-132	3	0-11	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-497-101	**LCS**	**Aqueous**	**ICP/MS 04**	**10/29/14**	**10/30/14 23:02**	**141029L03D**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	106.3	106	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	10/28/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2131
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-148-67	LCS	Aqueous	GC/MS AAA	10/30/14	10/31/14 17:40	141030L08

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Naphthalene	2.000	1.394	70	21-133	
2-Methylnaphthalene	2.000	1.382	69	21-140	
1-Methylnaphthalene	2.000	1.409	70	20-140	
Acenaphthylene	2.000	1.394	70	33-145	
Acenaphthene	2.000	1.451	73	55-121	
Fluorene	2.000	1.539	77	59-121	
Phenanthrene	2.000	1.447	72	54-120	
Anthracene	2.000	1.308	65	27-133	
Fluoranthene	2.000	1.538	77	26-137	
Pyrene	2.000	1.480	74	45-129	
Benzo (a) Anthracene	2.000	1.398	70	33-143	
Chrysene	2.000	1.425	71	17-168	
Benzo (k) Fluoranthene	2.000	1.412	71	24-159	
Benzo (b) Fluoranthene	2.000	1.322	66	24-159	
Benzo (a) Pyrene	2.000	1.150	58	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.251	63	25-175	
Dibenz (a,h) Anthracene	2.000	1.391	70	25-175	
Benzo (g,h,i) Perylene	2.000	1.514	76	25-157	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.	Date Received: 10/28/14
354 Uluniu Street, Suite 304	Work Order: 14-10-2131
Kailua, HI 96734-2500	Preparation: EPA 5030C
	Method: GC/MS / EPA 8260B
Project: Red Hill LTM 112066	Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-71	LCS	Aqueous	GC/MS OO	10/28/14	10/29/14 03:34	141028L046
099-13-057-71	LCSD	Aqueous	GC/MS OO	10/28/14	10/29/14 04:01	141028L046

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	50.00	44.78	90	N/A	N/A	40-140	N/A	0-20	
Benzene	50.00	51.34	103	N/A	N/A	80-120	N/A	0-20	
Bromodichloromethane	50.00	51.61	103	N/A	N/A	75-120	N/A	0-20	
Bromoform	50.00	49.35	99	N/A	N/A	70-130	N/A	0-20	
Bromomethane	50.00	44.25	88	N/A	N/A	30-145	N/A	0-20	
2-Butanone	50.00	47.46	95	N/A	N/A	30-150	N/A	0-20	
Carbon Tetrachloride	50.00	45.03	90	N/A	N/A	65-140	N/A	0-20	
Chlorobenzene	50.00	50.81	102	N/A	N/A	80-120	N/A	0-20	
Chloroethane	50.00	52.54	105	N/A	N/A	60-135	N/A	0-20	
Chloroform	50.00	51.69	103	N/A	N/A	65-135	N/A	0-20	
Chloromethane	50.00	44.16	88	N/A	N/A	40-125	N/A	0-20	
Dibromochloromethane	50.00	52.37	105	N/A	N/A	60-135	N/A	0-20	
1,2-Dibromo-3-Chloropropane	50.00	41.53	83	N/A	N/A	50-130	N/A	0-20	
1,2-Dibromoethane	50.00	52.74	105	N/A	N/A	80-120	N/A	0-20	
1,2-Dichlorobenzene	50.00	49.45	99	N/A	N/A	70-120	N/A	0-20	
1,3-Dichlorobenzene	50.00	48.61	97	N/A	N/A	75-125	N/A	0-20	
1,4-Dichlorobenzene	50.00	48.44	97	N/A	N/A	75-125	N/A	0-20	
1,1-Dichloroethane	50.00	48.98	98	N/A	N/A	70-135	N/A	0-20	
1,2-Dichloroethane	50.00	58.50	117	N/A	N/A	70-130	N/A	0-20	
1,1-Dichloroethene	50.00	50.88	102	N/A	N/A	70-130	N/A	0-20	
c-1,2-Dichloroethene	50.00	51.67	103	N/A	N/A	70-125	N/A	0-20	
t-1,2-Dichloroethene	50.00	50.30	101	N/A	N/A	60-140	N/A	0-20	
1,2-Dichloropropane	50.00	50.03	100	N/A	N/A	75-125	N/A	0-20	
c-1,3-Dichloropropene	50.00	48.68	97	N/A	N/A	70-130	N/A	0-20	
t-1,3-Dichloropropene	50.00	43.01	86	N/A	N/A	55-140	N/A	0-20	
Ethylbenzene	50.00	50.41	101	N/A	N/A	75-125	N/A	0-20	
Methylene Chloride	50.00	50.23	100	N/A	N/A	55-140	N/A	0-20	
4-Methyl-2-Pentanone	50.00	49.12	98	N/A	N/A	60-135	N/A	0-20	
Styrene	50.00	50.88	102	N/A	N/A	65-135	N/A	0-20	
1,1,1,2-Tetrachloroethane	50.00	48.61	97	N/A	N/A	80-130	N/A	0-20	
1,1,2,2-Tetrachloroethane	50.00	49.80	100	N/A	N/A	65-130	N/A	0-20	
Tetrachloroethene	50.00	52.93	106	N/A	N/A	45-150	N/A	0-20	
Toluene	50.00	51.72	103	N/A	N/A	75-120	N/A	0-20	
1,2,4-Trichlorobenzene	50.00	48.11	96	N/A	N/A	65-135	N/A	0-20	
1,1,1-Trichloroethane	50.00	47.64	95	N/A	N/A	65-130	N/A	0-20	
Hexachloro-1,3-Butadiene	50.00	48.39	97	N/A	N/A	50-140	N/A	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.	Date Received:	10/28/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2131
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066		Page 5 of 5

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
1,1,2-Trichloroethane	50.00	50.32	101	N/A	N/A	75-125	N/A	0-20	
Trichloroethene	50.00	49.50	99	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	52.64	105	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	54.73	109	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	100.3	100	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	51.10	102	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	45.38	91	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1077	108	1032	103	80-120	4	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-10-2131 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3005A Filt.	598	ICP/MS 04	1
EPA 8015B (M)	EPA 3510C	682	GC 45	1
EPA 8270C SIM PAHs	EPA 3510C	923	GC/MS AAA	1
GC/MS / EPA 8260B	EPA 5030C	849	GC/MS OO	2

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Glossary of Terms and Qualifiers

Work Order: 14-10-2131 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
DL	The Detection Limit (DL) is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD).
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Calscience Environmental Laboratories, Inc.

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contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **14-10-2131**

Date: 10/27/14 Page: 1 of 1

LABORATORY CLIENT: ESI

ADDRESS: 354 Uluniu St. Suite 304

CITY: Kailua STATE: HI ZIP: 96734

TEL: (808) 261-0740 E-MAIL: jhattemer@esciencei.com, dfeher@esciencei.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066

P.O. NO.:

PROJECT CONTACT: ~~AD~~ Jeff Hattemer

SAMPLER(S): (PRINT) JH, KM

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS:
Regular (full) GW monitoring analyte list

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☒ TPH(g) ☐ GRO (8260)	☒ TPH(d) ☐ DRO (8015)	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☐ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☒ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead (6020)			
1	ESTRIP	10/27/14	0830	water	3		X		X					X									X			
2	ES113	10/27/14	1400	water	10		X	X	X	X				X						X			X			
3	ES114	10/27/14	1045	water	10		X	X	X	X				X						X			X			
	ES114 MS/MSD	10/27/14	1045	water	10		X	X	X	X				X						X			X			
4	ES115	10/27/14	1115	water	10		X	X	X	X				X						X			X			
5	ES116	10/27/14	0900	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation) Fed Ex	Date: 10/27/14	Time: 1515
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 10/28/14	Time: 1000

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies, respectively.

01/01/14 Revision

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(2131)

RTO

NLA

SHIP DATE: 27OCT14
ACTWGT: 56.1 LB
CAD: /POS1525
DIMS: 26x14x13 IN

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7440 ...N WAY

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1 of 2
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TUE - 28 OCT AA
STANDARD OVERNIGHT

WZ APVA

92841
CA-US SNA

ORIGIN ID:HNLA

UNITED STATES US

SHIP DATE: 27OCT14
ACTWGT: 48.4 LB
CAD: /POS1525
DIMS: 26x14x13 IN

BILL RECIPIENT

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CALSCIENCE
7440 LINCOLN WAY

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E

2 of 2
MPS# 0681 7801 5009 0734
Mstr# 8045 5791 7364 0200

TUE - 28 OCT AA
STANDARD OVERNIGHT

WZ APVA

92841
CA-US SNA

eurofins | Calscience

WORK ORDER #: 14-10-[2][1][3][1]

SAMPLE RECEIPT FORM

Cooler 1 of 2

CLIENT: ESI

DATE: 10/28/14

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.1 °C - 0.2 °C (CF) = 1.9 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter Checked by: LS

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Checked by: LS

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present Checked by: SM6

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☑VOA (3) ☑VOA**h** (TB) ☐VOA**na**$_2$ ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na**$_2$ ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**nu** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na**$_2$ ☑250PB**n** (C-4) ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 1407028 **Labeled/Checked by:** SM

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** LS

Preservative: **h:** HCL **n:** HNO_3 **na**$_2$:$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** SM

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WORK ORDER #: 14-10-2 1 3 1

SAMPLE RECEIPT FORM

Cooler 2 of 2

CLIENT: ESI

DATE: 10/28/14

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.6 °C - 0.2 °C (CF) = 2.4 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** LS

CUSTODY SEALS INTACT:

☑ Cooler ☐_____ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** LS

☑ Sample ☐_____ ☐ No (Not Intact) ☐ Not Present **Checked by:** SM

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** SM

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** BG

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** SM

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2131**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 09:41
EXTRACTION:	EPA 3510C	REVIEWED BY:	628
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	2014-11-04 17:13

DATA FILE: W:\GC_45\GC 45 DATA\2014\141030\14103063.D\14103063

 # 2 **CLIENT SAMPLE NUMBER: ES113**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	23400	1.00	117	11	12	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103063.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-2

Vial Number : Vial 63
Injection Number : 1
Sequence Line : 63
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:41 am
Report Created on: 04 Nov 14 02:48 pm

Analysis Method : 8015B.MTH

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Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.024	2.51	1	VV	0.035	0.239
2	2.092	1.31	0	VV	0.048	0.125
3	2.223	7.06	2	VV	0.039	0.671
4	2.285	1.69	1	VV	0.022	0.161
5	2.334	3.26	1	VV	0.034	0.309
6	2.463	10.00	3	VV	0.048	0.950
7	2.511	3.68	2	VV	0.028	0.349
8	2.638	13.63	3	VV	0.070	1.294
9	2.753	24.19	5	VV	0.060	2.297
10	2.883	24.76	7	VV	0.045	2.351
11	2.943	15.15	5	VV	0.044	1.439
12	3.012	16.40	4	VV	0.062	1.558
13	3.094	8.03	4	VV	0.032	0.762
14	3.168	19.46	4	VV	0.056	1.848
15	3.306	37.68	4	VV	0.109	3.578
16	3.438	14.10	4	VV	0.050	1.339
17	3.508	16.84	4	VV	0.059	1.599
18	3.559	10.28	4	VV	0.041	0.976
19	3.602	13.03	3	VV	0.048	1.238
20	3.715	25.80	4	VV	0.089	2.450
21	3.849	7.80	3	VV	0.040	0.741
22	3.911	9.29	2	VV	0.067	0.882
23	4.017	11.82	3	VV	0.052	1.123
24	4.171	1.93	1	VV	0.034	0.183
25	4.238	5.50	1	VV	0.075	0.523
26	4.399	7.57	1	VV	0.119	0.718
27	4.593	1.54	0	VV	0.046	0.146
28	4.690	5.13	1	VV	0.090	0.487
29	4.848	2.51	1	VV	0.046	0.239
30	4.909	1.46	1	VV	0.036	0.138
31	4.967	1.29	1	VV	0.034	0.122
32	5.069	3.16	1	VV	0.044	0.300
33	5.220	2.72	1	VV	0.044	0.258
34	5.278	1.24	0	VV	0.044	0.118
35	5.373	721.21	503	VV	0.024	68.488

Total area =

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103063.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-2

Vial Number : Vial 63
Injection Number : 1
Sequence Line : 63
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:41 am
Report Created on: 04 Nov 14 02:48 pm

Analysis Method : 8015B.MTH

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1053.05

Area Percent Report

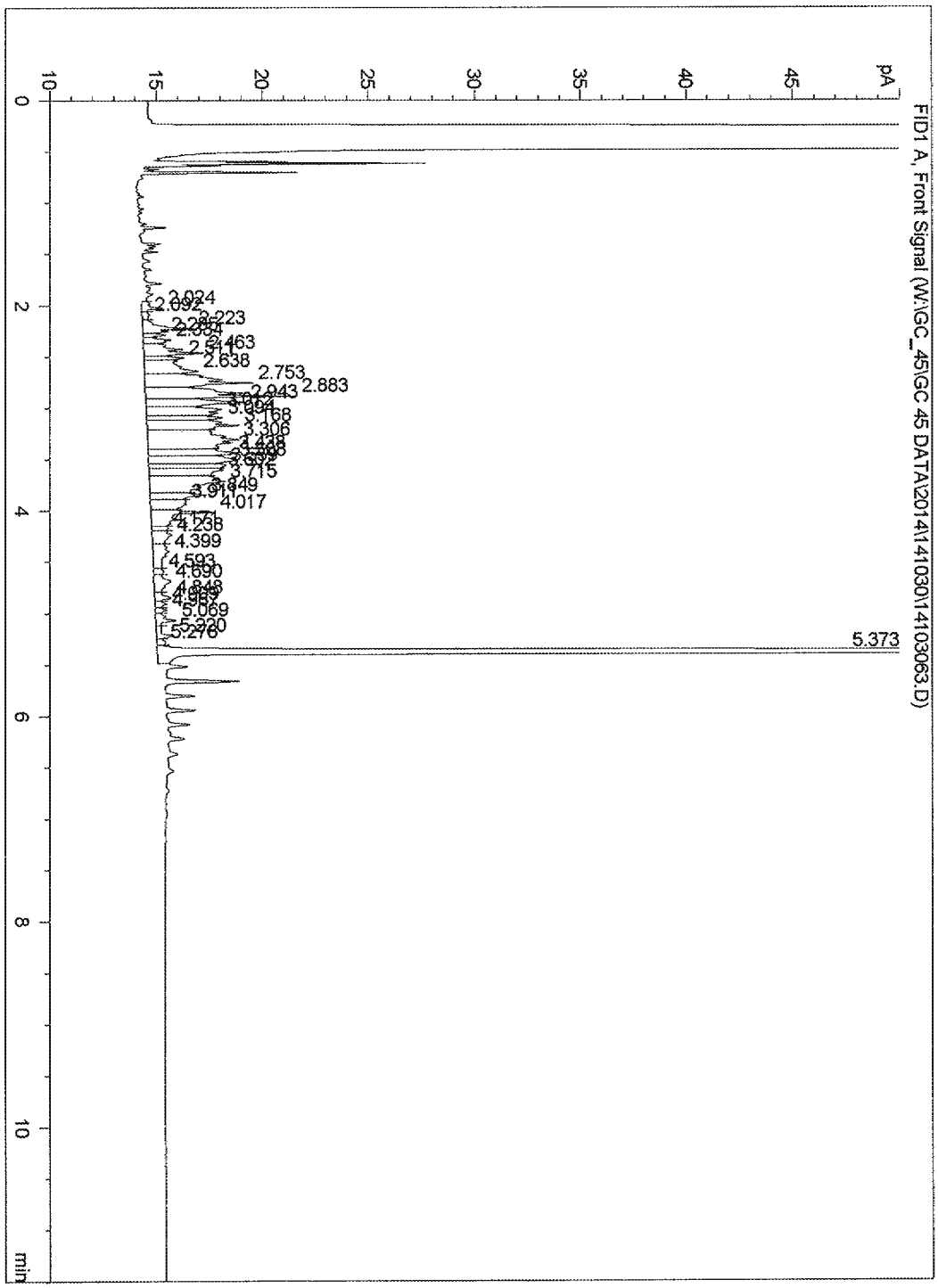
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103063.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-2

Vial Number : Vial 63
Injection Number : 1
Sequence Line : 63
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:41 am
Report Created on: 04 Nov 14 02:48 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2131**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 09:59
EXTRACTION:	EPA 3510C	REVIEWED BY:	628
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	2014-11-04 17:13

DATA FILE: W:\GC_45\GC 45 DATA\2014\141030\14103064.D\14103064

 # 3 **CLIENT SAMPLE NUMBER: ES114**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:	141030S06	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	409000	1.00	2050	11	12	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103064.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-3

Vial Number : Vial 64
Injection Number : 1
Sequence Line : 64
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:59 am
Report Created on: 04 Nov 14 02:49 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	1.947	36.87	21	VV	0.025	0.554
2	2.028	166.85	76	VV	0.032	2.505
3	2.173	220.62	128	VV	0.027	3.313
4	2.258	188.02	81	VV	0.032	2.823
5	2.353	227.05	110	VV	0.029	3.409
6	2.457	789.99	535	VV	0.022	11.862
7	2.544	191.88	47	VV	0.053	2.881
8	2.600	106.50	52	VV	0.030	1.599
9	2.642	116.77	54	VV	0.032	1.753
10	2.729	439.52	208	VV	0.030	6.599
11	2.769	366.68	248	VV	0.022	5.506
12	2.853	424.12	97	VV	0.056	6.368
13	2.948	289.07	81	VV	0.050	4.340
14	3.014	234.69	134	VV	0.025	3.524
15	3.058	266.23	81	VV	0.043	3.998
16	3.146	250.38	51	VV	0.064	3.759
17	3.298	368.20	51	VV	0.087	5.529
18	3.431	256.38	41	VV	0.083	3.850
19	3.498	130.37	37	VV	0.045	1.957
20	3.558	234.19	40	VV	0.074	3.516
21	3.687	134.10	32	VV	0.053	2.013
22	3.773	105.43	22	VV	0.060	1.583
23	3.853	46.10	18	VV	0.035	0.692
24	3.899	37.48	16	VV	0.032	0.563
25	3.938	58.23	19	VV	0.042	0.874
26	4.010	116.07	14	VV	0.102	1.743
27	4.261	19.12	4	VV	0.056	0.287
28	4.348	45.09	4	VV	0.154	0.677
29	4.681	20.80	3	VV	0.098	0.312
30	4.832	7.60	2	VV	0.050	0.114
31	4.891	5.24	2	VV	0.043	0.079
32	4.950	5.08	2	VV	0.046	0.076
33	5.048	12.74	2	VV	0.082	0.191
34	5.199	6.89	2	VV	0.054	0.103
35	5.250	4.12	1	VV	0.043	0.062
36	5.351	731.57	493	VV	0.024	10.984

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103064.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-3

Vial Number : Vial 64
Injection Number : 1
Sequence Line : 64
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:59 am
Report Created on: 04 Nov 14 02:49 pm

Analysis Method : 8015B.MTH

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Total area = 6660.03

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103064.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-3

Vial Number : Vial 64
Injection Number : 1
Sequence Line : 64
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 09:59 am
Report Created on: 04 Nov 14 02:49 pm

Analysis Method : 8015B.MTH

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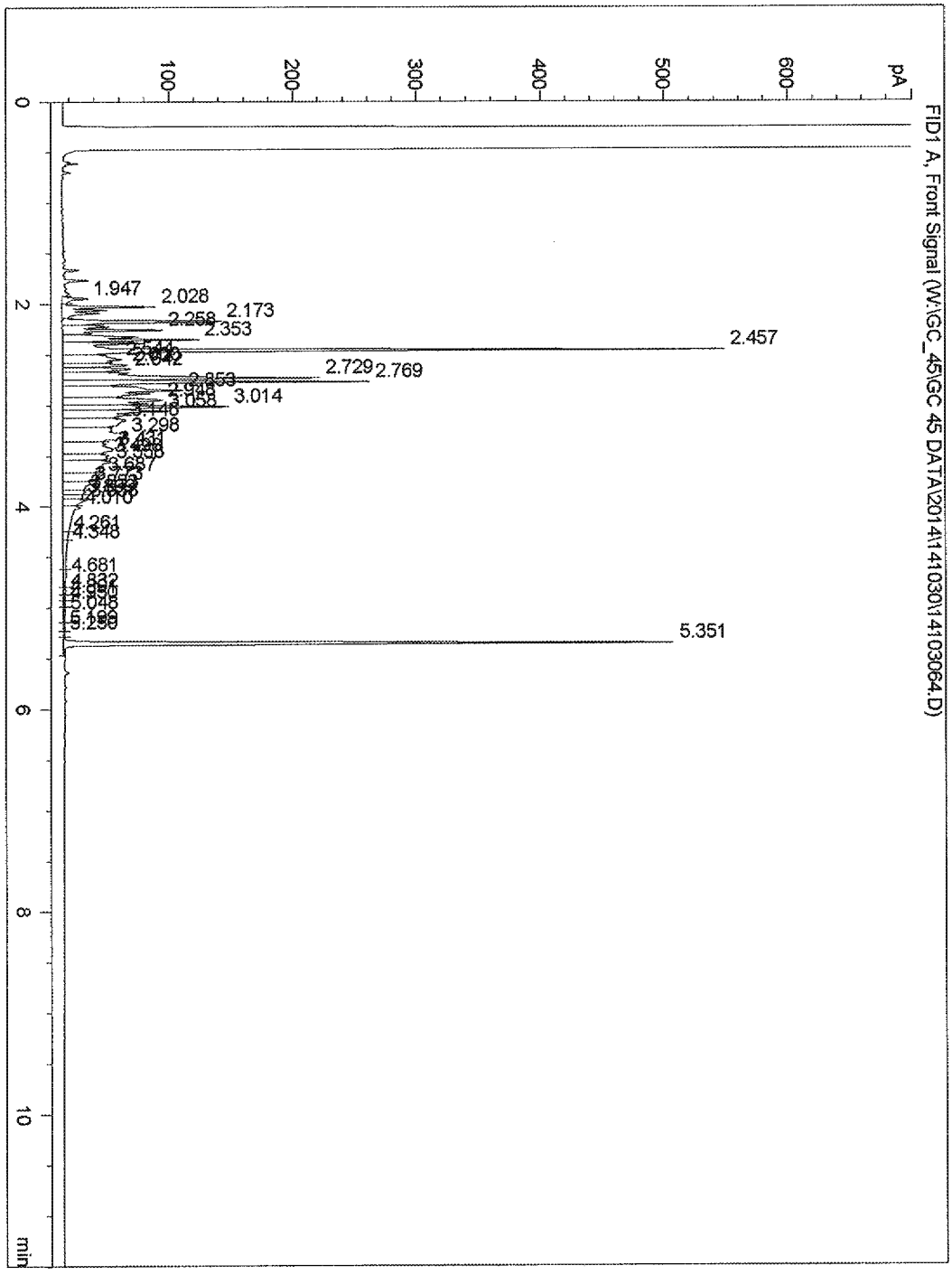


RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2131**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 10:41
EXTRACTION:	EPA 3510C	REVIEWED BY:	628
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	2014-11-04 17:13

DATA FILE: W:\GC_45\GC 45 DATA\2014\141030\14103065.D\14103065

 # 4 **CLIENT SAMPLE NUMBER: ES115**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	406000	1.00	2030	11	12	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103065.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-4

Vial Number : Vial 65
Injection Number : 1
Sequence Line : 65
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 10:41 am
Report Created on: 04 Nov 14 02:50 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	1.946	36.71	21	VV	0.026	0.555
2	2.028	169.15	75	VV	0.031	2.559
3	2.173	226.98	127	VV	0.028	3.434
4	2.222	61.36	36	VV	0.025	0.928
5	2.257	128.76	81	VV	0.024	1.948
6	2.352	231.89	109	VV	0.030	3.508
7	2.457	829.85	551	VV	0.023	12.555
8	2.542	189.89	47	VV	0.055	2.873
9	2.600	104.99	51	VV	0.030	1.588
10	2.641	115.18	56	VV	0.030	1.743
11	2.730	449.33	212	VV	0.030	6.798
12	2.770	375.36	260	VV	0.022	5.679
13	2.852	404.48	91	VV	0.057	6.119
14	2.947	210.06	78	VV	0.041	3.178
15	3.014	316.74	136	VV	0.032	4.792
16	3.059	267.38	81	VV	0.044	4.045
17	3.149	231.23	48	VV	0.063	3.498
18	3.296	424.16	48	VV	0.113	6.417
19	3.431	166.71	41	VV	0.053	2.522
20	3.502	122.86	33	VV	0.047	1.859
21	3.561	218.09	37	VV	0.075	3.299
22	3.690	126.19	30	VV	0.054	1.909
23	3.783	94.82	21	VV	0.059	1.434
24	3.861	40.17	17	VV	0.033	0.608
25	3.907	37.37	15	VV	0.039	0.565
26	3.950	52.52	16	VV	0.043	0.795
27	4.023	152.63	12	VV	0.159	2.309
28	4.603	7.19	2	VV	0.051	0.109
29	4.719	16.45	2	VV	0.095	0.249
30	4.871	7.28	2	VV	0.051	0.110
31	4.931	5.14	1	VV	0.054	0.078
32	4.994	4.19	1	VV	0.043	0.063
33	5.096	12.49	2	VV	0.083	0.189
34	5.252	5.63	2	VV	0.045	0.085
35	5.313	3.60	1	VV	0.044	0.054
36	5.408	762.98	520	VV	0.023	11.543

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103065.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-4
Acquired on : 31 Oct 14 10:41 am
Report Created on: 04 Nov 14 02:50 pm
Vial Number : Vial 65
Injection Number : 1
Sequence Line : 65
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Total area = 6609.83

Area Percent Report

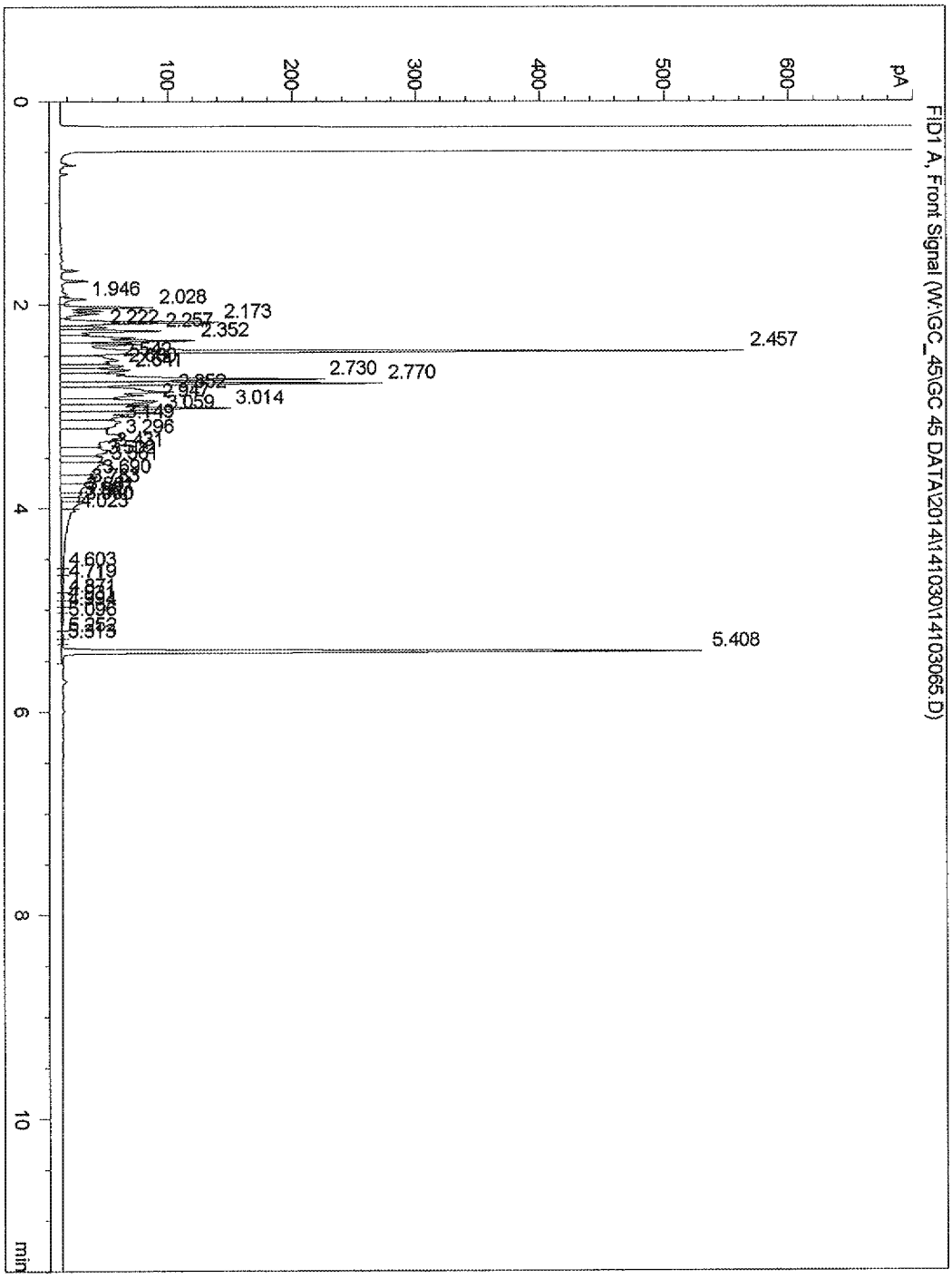
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103065.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-4

Vial Number : Vial 65
Injection Number : 1
Sequence Line : 65
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 10:41 am
Report Created on: 04 Nov 14 02:50 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2131**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 10:58
EXTRACTION:	EPA 3510C	REVIEWED BY:	628
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	2014-11-04 17:13

DATA FILE: W:\GC_45\GC 45 DATA\2014\141030\14103066.D\14103066

 # 5 **CLIENT SAMPLE NUMBER: ES116**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:	141030S06	FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	16000	1.00	79.9	11	12	25	b

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103066.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-5
Vial Number : Vial 66
Injection Number : 1
Sequence Line : 66
Instrument Method: C:\CHEM32\1\METHODS\ ->
Acquired on : 31 Oct 14 10:58 am
Report Created on: 04 Nov 14 02:51 pm
Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.219	0.45	0	VV	0.038	0.060
2	2.270	0.27	0	VV	0.031	0.036
3	2.457	0.84	0	VV	0.065	0.113
4	2.634	1.87	1	VV	0.049	0.252
5	2.750	4.97	1	VV	0.064	0.669
6	2.837	1.49	1	VV	0.037	0.200
7	2.884	1.51	1	VV	0.032	0.204
8	2.950	2.03	1	VV	0.045	0.273
9	3.169	12.58	2	VV	0.078	1.695
10	3.306	10.78	2	VV	0.070	1.452
11	3.372	8.28	2	VV	0.058	1.115
12	3.436	8.46	3	VV	0.046	1.139
13	3.511	26.81	3	VV	0.117	3.611
14	3.701	20.15	2	VV	0.122	2.714
15	3.846	7.00	2	VV	0.051	0.943
16	3.937	5.92	2	VV	0.052	0.797
17	4.012	7.26	3	VV	0.036	0.978
18	4.111	8.62	2	VV	0.075	1.161
19	4.228	13.65	2	VV	0.096	1.839
20	4.387	20.35	2	VV	0.137	2.740
21	4.560	13.57	2	VV	0.100	1.828
22	4.662	12.72	2	VV	0.090	1.714
23	4.826	7.22	2	VV	0.064	0.972
24	4.889	3.85	1	VV	0.042	0.518
25	4.946	6.18	1	VV	0.061	0.832
26	5.043	8.15	1	VV	0.074	1.097
27	5.193	3.65	1	VV	0.041	0.492
28	5.249	2.50	1	VV	0.048	0.337
29	5.344	521.35	374	VV	0.022	70.220

Total area = 742.45

Area Percent Report

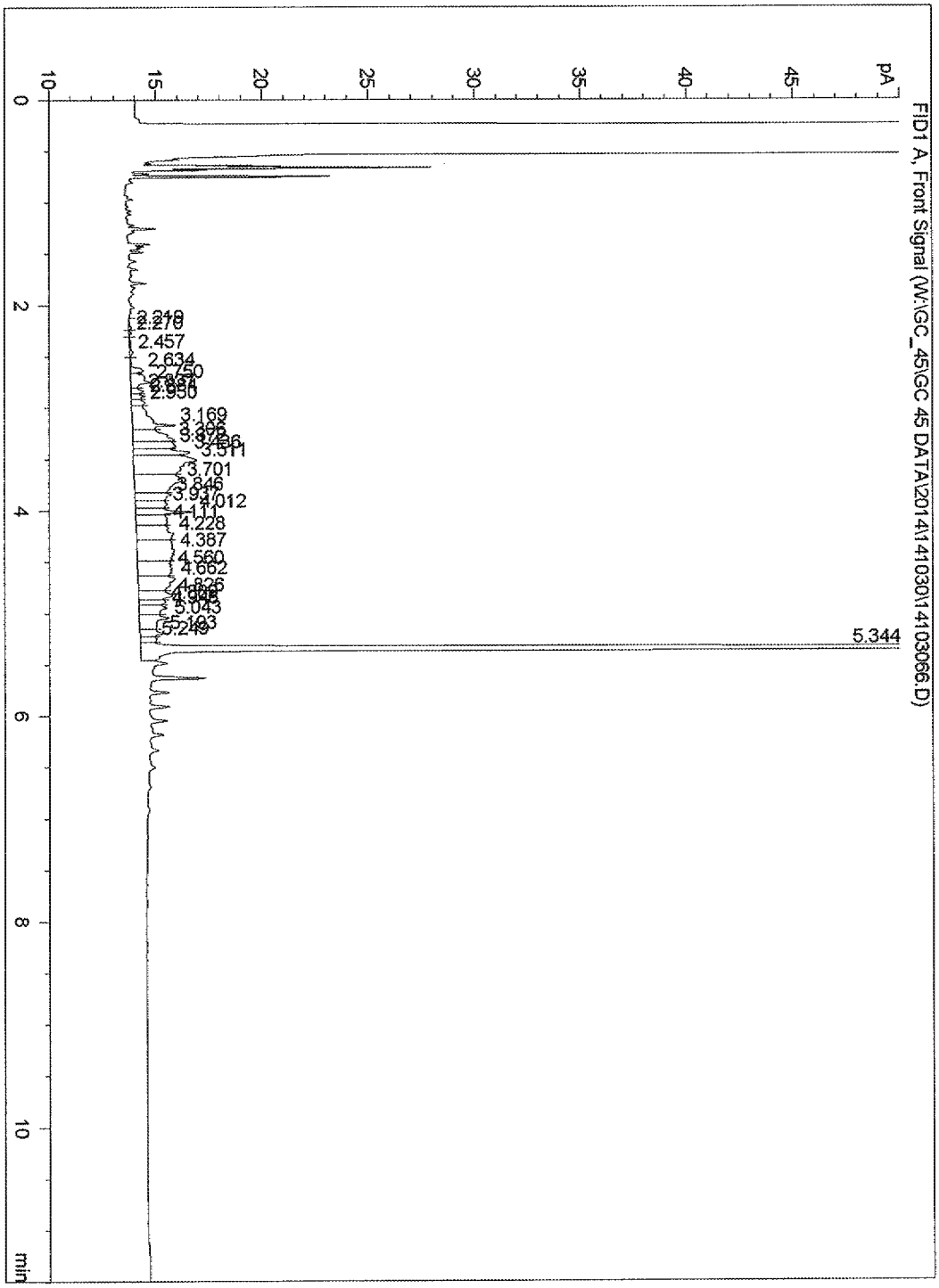
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103066.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2131-5

Vial Number : Vial 66
Injection Number : 1
Sequence Line : 66
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 10:58 am
Report Created on: 04 Nov 14 02:51 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



Area Percent Report

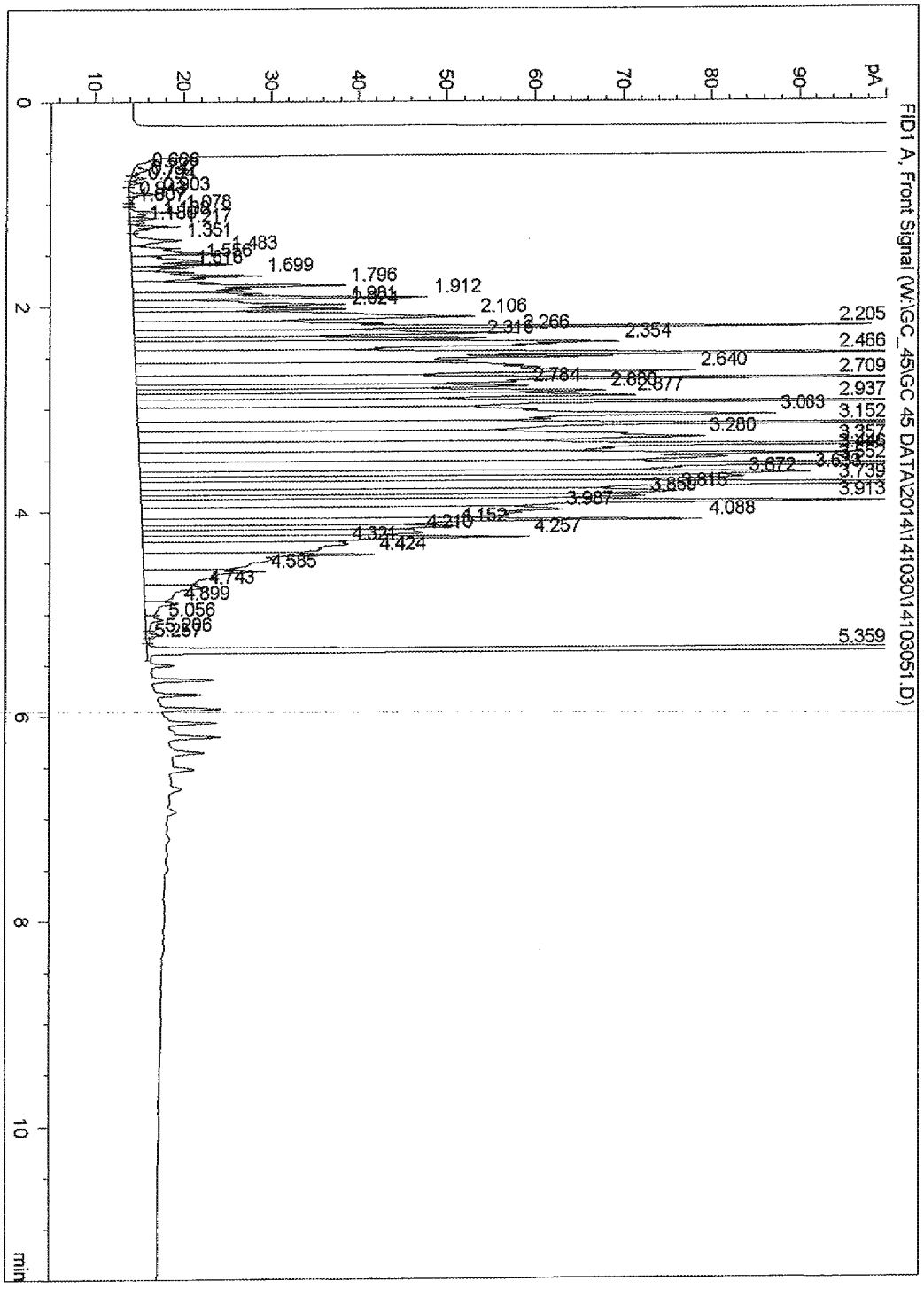
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103051.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : D400 C28 50 L080814D

Vial Number : Vial 51
Injection Number : 1
Sequence Line : 51
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 06:11 am
Report Created on: 04 Nov 14 01:18 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



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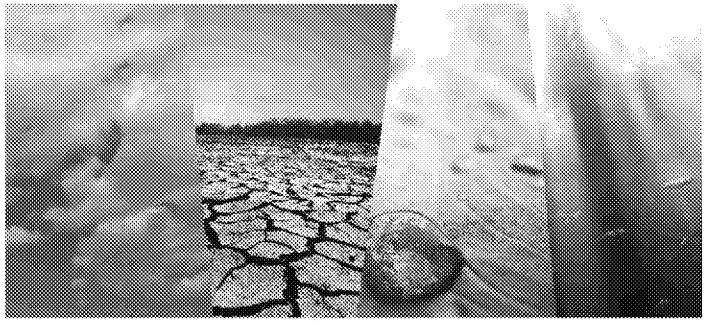
WORK ORDER NUMBER: 14-10-2234

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

Attention: Jeff Hattemer
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 11/05/2014 by:
Richard Villafania
Project Manager

ResultLink ▸

Email your PM ▸

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

ED_006532_00009894-00127

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Client Project Name: Red Hill LTM 112066
Work Order Number: 14-10-2234

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Work Order Narrative

Work Order: 14-10-2234 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/29/14. They were assigned to Work Order 14-10-2234.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES117	**14-10-2234-2-G**	**10/28/14 12:00**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 11:16**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	22	11	12	25	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	85	51-141	

ES118	**14-10-2234-3-G**	**10/28/14 14:30**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 11:35**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- TPH as Diesel is quantified in the carbon range C10-C28.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	16	11	12	25	1.00	HD,J

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	70	51-141	

Method Blank	**099-15-516-206**	**N/A**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:03**	**141030B06**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
TPH as Diesel	<12	11	12	25	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	117	51-141	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES118	**14-10-2234-3-J**	**10/28/14 14:30**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 15:10**	**141031L04F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	1.00	1.00	U

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-497-104**	**N/A**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:48**	**141031L04F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Lead	<0.200	0.0898	0.200	1.00	1.00	U

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES117	**14-10-2234-2-I**	**10/28/14 12:00**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 17:03**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.049	0.033	0.049	0.19	1.00	U
2-Methylnaphthalene	<0.049	0.045	0.049	0.19	1.00	U
1-Methylnaphthalene	<0.097	0.050	0.097	0.19	1.00	U
Acenaphthylene	<0.049	0.043	0.049	0.19	1.00	U
Acenaphthene	<0.049	0.026	0.049	0.19	1.00	U
Fluorene	<0.049	0.041	0.049	0.19	1.00	U
Phenanthrene	<0.049	0.026	0.049	0.19	1.00	U
Anthracene	<0.049	0.028	0.049	0.19	1.00	U
Fluoranthene	<0.049	0.045	0.049	0.19	1.00	U
Pyrene	<0.049	0.020	0.049	0.19	1.00	U
Benzo (a) Anthracene	<0.049	0.032	0.049	0.19	1.00	U
Chrysene	<0.049	0.024	0.049	0.19	1.00	U
Benzo (k) Fluoranthene	<0.049	0.030	0.049	0.19	1.00	U
Benzo (b) Fluoranthene	<0.049	0.017	0.049	0.19	1.00	U
Benzo (a) Pyrene	<0.049	0.022	0.049	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.049	0.021	0.049	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.049	0.046	0.049	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.097	0.080	0.097	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	61	28-139	
2-Fluorobiphenyl	81	33-144	
p-Terphenyl-d14	83	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES118	**14-10-2234-3-I**	**10/28/14 14:30**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 17:26**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.048	0.033	0.048	0.19	1.00	U
2-Methylnaphthalene	<0.048	0.045	0.048	0.19	1.00	U
1-Methylnaphthalene	<0.096	0.050	0.096	0.19	1.00	U
Acenaphthylene	<0.048	0.043	0.048	0.19	1.00	U
Acenaphthene	<0.048	0.026	0.048	0.19	1.00	U
Fluorene	<0.048	0.041	0.048	0.19	1.00	U
Phenanthrene	<0.048	0.026	0.048	0.19	1.00	U
Anthracene	<0.048	0.028	0.048	0.19	1.00	U
Fluoranthene	<0.048	0.045	0.048	0.19	1.00	U
Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Benzo (a) Anthracene	<0.048	0.031	0.048	0.19	1.00	U
Chrysene	<0.048	0.024	0.048	0.19	1.00	U
Benzo (k) Fluoranthene	<0.048	0.030	0.048	0.19	1.00	U
Benzo (b) Fluoranthene	<0.048	0.017	0.048	0.19	1.00	U
Benzo (a) Pyrene	<0.048	0.021	0.048	0.19	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.048	0.020	0.048	0.19	1.00	U
Dibenz (a,h) Anthracene	<0.048	0.046	0.048	0.19	1.00	U
Benzo (g,h,i) Perylene	<0.096	0.079	0.096	0.19	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	62	28-139	
2-Fluorobiphenyl	88	33-144	
p-Terphenyl-d14	94	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-148-67**	**N/A**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 17:17**	**141030L08**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Naphthalene	<0.050	0.034	0.050	0.20	1.00	U
2-Methylnaphthalene	<0.050	0.046	0.050	0.20	1.00	U
1-Methylnaphthalene	<0.10	0.052	0.10	0.20	1.00	U
Acenaphthylene	<0.050	0.045	0.050	0.20	1.00	U
Acenaphthene	<0.050	0.027	0.050	0.20	1.00	U
Fluorene	<0.050	0.043	0.050	0.20	1.00	U
Phenanthrene	<0.050	0.027	0.050	0.20	1.00	U
Anthracene	<0.050	0.029	0.050	0.20	1.00	U
Fluoranthene	<0.050	0.047	0.050	0.20	1.00	U
Pyrene	<0.050	0.020	0.050	0.20	1.00	U
Benzo (a) Anthracene	<0.050	0.033	0.050	0.20	1.00	U
Chrysene	<0.050	0.025	0.050	0.20	1.00	U
Benzo (k) Fluoranthene	<0.050	0.031	0.050	0.20	1.00	U
Benzo (b) Fluoranthene	<0.050	0.018	0.050	0.20	1.00	U
Benzo (a) Pyrene	<0.050	0.022	0.050	0.20	1.00	U
Indeno (1,2,3-c,d) Pyrene	<0.050	0.021	0.050	0.20	1.00	U
Dibenz (a,h) Anthracene	<0.050	0.048	0.050	0.20	1.00	U
Benzo (g,h,i) Perylene	<0.10	0.082	0.10	0.20	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	53	28-139	
2-Fluorobiphenyl	68	33-144	
p-Terphenyl-d14	72	23-160	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES TRIP	**14-10-2234-1-A**	**10/28/14 11:00**	**Aqueous**	**GC/MS OO**	**10/31/14**	**11/01/14 01:14**	**141031L047**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IJ
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	0.43	0.43	0.50	1.0	1.00	J
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.	Date Received:	10/29/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2234
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
	Units:	ug/L
Project: Red Hill LTM 112066		Page 2 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	96	80-126	
1,2-Dichloroethane-d4	100	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	97	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 3 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES117	**14-10-2234-2-A**	**10/28/14 12:00**	**Aqueous**	**GC/MS OO**	**10/31/14**	**11/01/14 02:36**	**141031L047**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IJ
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.	Date Received:	10/29/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2234
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
	Units:	ug/L
Project: Red Hill LTM 112066		Page 4 of 8

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	96	80-126	
1,2-Dichloroethane-d4	99	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	95	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 5 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES118	**14-10-2234-3-A**	**10/28/14 14:30**	**Aqueous**	**GC/MS OO**	**10/31/14**	**11/01/14 03:04**	**141031L047**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U,ICH
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U,IJ
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/29/14
Work Order: 14-10-2234
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	96	80-126	
1,2-Dichloroethane-d4	100	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	96	88-112	
1,4-Bromofluorobenzene	97	80-120	

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
		Units:	ug/L
Project: Red Hill LTM 112066			Page 7 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-13-057-72**	**N/A**	**Aqueous**	**GC/MS OO**	**10/31/14**	**10/31/14 22:31**	**141031L047**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
Acetone	<10	6.0	10	20	1.00	U
Benzene	<0.50	0.14	0.50	1.0	1.00	U
Bromodichloromethane	<0.50	0.21	0.50	5.0	1.00	U
Bromoform	<1.0	0.50	1.0	10	1.00	U
Bromomethane	<5.0	3.9	5.0	20	1.00	U
2-Butanone	<5.0	2.2	5.0	10	1.00	U
Carbon Tetrachloride	<0.50	0.23	0.50	1.0	1.00	U
Chlorobenzene	<0.50	0.17	0.50	5.0	1.00	U
Chloroethane	<5.0	2.3	5.0	10	1.00	U
Chloroform	<0.50	0.46	0.50	5.0	1.00	U
Chloromethane	<2.0	1.8	2.0	10	1.00	U
Dibromochloromethane	<0.50	0.25	0.50	1.0	1.00	U
1,2-Dibromo-3-Chloropropane	<2.0	1.2	2.0	10	1.00	U
1,2-Dibromoethane	<0.50	0.36	0.50	1.0	1.00	U
1,2-Dichlorobenzene	<0.50	0.46	0.50	1.0	1.00	U
1,3-Dichlorobenzene	<0.50	0.40	0.50	1.0	1.00	U
1,4-Dichlorobenzene	<0.50	0.43	0.50	1.0	1.00	U
1,1-Dichloroethane	<0.50	0.28	0.50	5.0	1.00	U
1,2-Dichloroethane	<0.50	0.24	0.50	1.0	1.00	U
1,1-Dichloroethene	<0.50	0.43	0.50	1.0	1.00	U
c-1,2-Dichloroethene	<0.50	0.48	0.50	1.0	1.00	U
t-1,2-Dichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2-Dichloropropane	<0.50	0.42	0.50	5.0	1.00	U
c-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
t-1,3-Dichloropropene	<0.50	0.25	0.50	1.0	1.00	U
Ethylbenzene	<0.50	0.14	0.50	1.0	1.00	U
Methylene Chloride	<1.0	0.64	1.0	5.0	1.00	U
4-Methyl-2-Pentanone	<5.0	4.4	5.0	10	1.00	U
Styrene	<0.50	0.17	0.50	1.0	1.00	U
1,1,1,2-Tetrachloroethane	<0.50	0.40	0.50	1.0	1.00	U
1,1,2,2-Tetrachloroethane	<0.50	0.41	0.50	1.0	1.00	U
Tetrachloroethene	<0.50	0.39	0.50	5.0	1.00	U
Toluene	<0.50	0.24	0.50	1.0	1.00	U
1,2,4-Trichlorobenzene	<1.0	0.50	1.0	5.0	1.00	U
1,1,1-Trichloroethane	<0.50	0.30	0.50	5.0	1.00	U
Hexachloro-1,3-Butadiene	<0.50	0.32	0.50	1.0	1.00	U

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Analytical Report

Environmental Science International, Inc.
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Date Received: 10/29/14
Work Order: 14-10-2234
Preparation: EPA 5030C
Method: GC/MS / EPA 8260B
Units: ug/L

Project: Red Hill LTM 112066

Parameter	Result	DL	LOD	LOQ	DF	Qualifiers
1,1,2-Trichloroethane	<0.50	0.38	0.50	1.0	1.00	U
Trichloroethene	<0.50	0.37	0.50	1.0	1.00	U
1,2,3-Trichloropropane	<1.0	0.64	1.0	5.0	1.00	U
Vinyl Chloride	<0.50	0.30	0.50	1.0	1.00	U
p/m-Xylene	<1.0	0.30	1.0	10	1.00	U
o-Xylene	<0.50	0.23	0.50	1.0	1.00	U
Methyl-t-Butyl Ether (MTBE)	<0.50	0.31	0.50	1.0	1.00	U
Gasoline Range Organics	<30	26	30	50	1.00	U

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	95	80-126	
1,2-Dichloroethane-d4	99	80-134	
Toluene-d8	99	80-120	
Toluene-d8-TPPH	95	88-112	
1,4-Bromofluorobenzene	96	80-120	

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	10/29/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2234
Kailua, HI 96734-2500	Preparation:	EPA 3005A Filt.
	Method:	EPA 6020
Project: Red Hill LTM 112066		Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES118	**Sample**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 15:10**	**141031S04**
ES118	**Matrix Spike**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:59**	**141031S04**
ES118	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 15:01**	**141031S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	109.0	109	109.2	109	80-120	0	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 2 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-10-2131-3	**Sample**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**11/03/14 18:28**	**141030S08**
14-10-2131-3	**Matrix Spike**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 18:04**	**141030S08**
14-10-2131-3	**Matrix Spike Duplicate**	**Aqueous**	**GC/MS AAA**	**10/30/14**	**10/31/14 18:27**	**141030S08**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Naphthalene	143.3	2.000	83.89	0	78.94	0	21-133	6	0-25	3
2-Methylnaphthalene	42.74	2.000	34.71	0	32.01	0	21-140	8	0-25	3
1-Methylnaphthalene	59.00	2.000	47.61	0	45.00	0	20-140	6	0-25	3
Acenaphthylene	ND	2.000	1.706	85	1.549	77	33-145	10	0-25	
Acenaphthene	0.5300	2.000	2.109	79	1.970	72	49-121	7	0-25	
Fluorene	ND	2.000	1.860	93	1.701	85	59-121	9	0-25	
Phenanthrene	ND	2.000	1.624	81	1.459	73	54-120	11	0-25	
Anthracene	ND	2.000	1.548	77	1.417	71	27-133	9	0-25	
Fluoranthene	ND	2.000	1.666	83	1.524	76	26-137	9	0-25	
Pyrene	ND	2.000	1.581	79	1.473	74	18-168	7	0-25	
Benzo (a) Anthracene	ND	2.000	1.551	78	1.422	71	33-143	9	0-25	
Chrysene	ND	2.000	1.540	77	1.402	70	17-168	9	0-25	
Benzo (k) Fluoranthene	ND	2.000	1.447	72	1.319	66	24-159	9	0-25	
Benzo (b) Fluoranthene	ND	2.000	1.372	69	1.248	62	24-159	9	0-25	
Benzo (a) Pyrene	ND	2.000	1.331	67	1.216	61	17-163	9	0-25	
Indeno (1,2,3-c,d) Pyrene	ND	2.000	1.320	66	1.166	58	10-171	12	0-25	
Dibenz (a,h) Anthracene	ND	2.000	1.422	71	1.275	64	10-219	11	0-25	
Benzo (g,h,i) Perylene	ND	2.000	1.524	76	1.373	69	10-227	10	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 5030C
		Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066			Page 3 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-10-2387-2	Sample	Aqueous	GC/MS OO	10/31/14	10/31/14 22:58	141031S031
14-10-2387-2	Matrix Spike	Aqueous	GC/MS OO	10/31/14	10/31/14 23:26	141031S031
14-10-2387-2	Matrix Spike Duplicate	Aqueous	GC/MS OO	10/31/14	10/31/14 23:53	141031S031

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	ND	50.00	67.72	135	76.03	152	40-140	12	0-20	3
Benzene	ND	50.00	49.93	100	49.48	99	80-120	1	0-20	
Bromodichloromethane	ND	50.00	48.33	97	48.57	97	75-120	0	0-20	
Bromoform	ND	50.00	49.21	98	50.44	101	70-130	2	0-20	
Bromomethane	ND	50.00	49.22	98	41.35	83	30-145	17	0-20	
2-Butanone	ND	50.00	59.57	119	59.62	119	30-150	0	0-20	
Carbon Tetrachloride	ND	50.00	51.03	102	49.80	100	65-140	2	0-20	
Chlorobenzene	ND	50.00	48.15	96	48.88	98	80-120	2	0-20	
Chloroethane	ND	50.00	44.85	90	44.26	89	60-135	1	0-20	
Chloroform	ND	50.00	50.30	101	49.66	99	65-135	1	0-20	
Chloromethane	ND	50.00	44.19	88	44.72	89	40-125	1	0-20	
Dibromochloromethane	ND	50.00	49.33	99	50.66	101	60-135	3	0-20	
1,2-Dibromo-3-Chloropropane	ND	50.00	43.24	86	46.97	94	50-130	8	0-20	
1,2-Dibromoethane	ND	50.00	50.20	100	52.08	104	80-120	4	0-20	
1,2-Dichlorobenzene	ND	50.00	47.25	95	48.04	96	70-120	2	0-20	
1,3-Dichlorobenzene	ND	50.00	48.17	96	47.98	96	75-125	0	0-20	
1,4-Dichlorobenzene	ND	50.00	46.86	94	47.50	95	75-125	1	0-20	
1,1-Dichloroethane	ND	50.00	48.12	96	47.56	95	70-135	1	0-20	
1,2-Dichloroethane	ND	50.00	49.85	100	50.61	101	70-130	1	0-20	
1,1-Dichloroethene	ND	50.00	46.89	94	46.82	94	70-130	0	0-20	
c-1,2-Dichloroethene	ND	50.00	51.13	102	50.25	101	70-125	2	0-20	
t-1,2-Dichloroethene	ND	50.00	50.60	101	49.80	100	60-140	2	0-20	
1,2-Dichloropropane	ND	50.00	48.06	96	48.21	96	75-125	0	0-20	
c-1,3-Dichloropropene	ND	50.00	51.62	103	52.11	104	70-130	1	0-20	
t-1,3-Dichloropropene	ND	50.00	50.09	100	51.77	104	55-140	3	0-20	
Ethylbenzene	ND	50.00	49.56	99	49.72	99	75-125	0	0-20	
Methylene Chloride	ND	50.00	47.52	95	49.08	98	55-140	3	0-20	
4-Methyl-2-Pentanone	ND	50.00	44.42	89	50.80	102	60-135	13	0-20	
Styrene	ND	50.00	49.18	98	49.95	100	65-135	2	0-20	
1,1,1,2-Tetrachloroethane	ND	50.00	50.43	101	50.94	102	80-130	1	0-20	
1,1,2,2-Tetrachloroethane	ND	50.00	48.99	98	51.35	103	65-130	5	0-20	
Tetrachloroethene	ND	50.00	50.71	101	52.32	105	45-150	3	0-20	
Toluene	ND	50.00	48.58	97	49.23	98	75-120	1	0-20	
1,2,4-Trichlorobenzene	ND	50.00	44.33	89	46.15	92	65-135	4	0-20	
1,1,1-Trichloroethane	ND	50.00	50.20	100	48.87	98	65-130	3	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received: 10/29/14
354 Uluniu Street, Suite 304	Work Order: 14-10-2234
Kailua, HI 96734-2500	Preparation: EPA 5030C
	Method: GC/MS / EPA 8260B
Project: Red Hill LTM 112066	Page 4 of 4

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Hexachloro-1,3-Butadiene	ND	50.00	45.69	91	45.79	92	50-140	0	0-20	
1,1,2-Trichloroethane	ND	50.00	49.59	99	51.28	103	75-125	3	0-20	
Trichloroethene	ND	50.00	47.79	96	47.66	95	70-125	0	0-20	
1,2,3-Trichloropropane	ND	50.00	47.54	95	51.06	102	75-125	7	0-20	
Vinyl Chloride	ND	50.00	47.42	95	46.59	93	50-145	2	0-20	
p/m-Xylene	ND	100.0	98.13	98	98.70	99	75-130	1	0-20	
o-Xylene	ND	50.00	49.82	100	49.94	100	80-120	0	0-20	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	47.63	95	49.54	99	65-125	4	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES118	**Sample**	**Aqueous**	**ICP/MS 04**	**10/31/14 00:00**	**11/03/14 15:10**	**141031S04**
ES118	**PDS**	**Aqueous**	**ICP/MS 04**	**10/31/14 00:00**	**11/03/14 15:03**	**141031S04**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	102.6	103	75-125	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
Project: Red Hill LTM 112066			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-516-206	**LCS**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:20**	**141030B06**
099-15-516-206	**LCSD**	**Aqueous**	**GC 45**	**10/30/14**	**10/31/14 07:37**	**141030B06**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	2000	2296	115	2219	111	60-132	3	0-11	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
Project: Red Hill LTM 112066			Page 2 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-497-104	**LCS**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:50**	**141031L04F**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	102.6	103	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Red Hill LTM 112066			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-148-67	LCS	Aqueous	GC/MS AAA	10/30/14	10/31/14 17:40	141030L08

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Naphthalene	2.000	1.394	70	21-133	
2-Methylnaphthalene	2.000	1.382	69	21-140	
1-Methylnaphthalene	2.000	1.409	70	20-140	
Acenaphthylene	2.000	1.394	70	33-145	
Acenaphthene	2.000	1.451	73	55-121	
Fluorene	2.000	1.539	77	59-121	
Phenanthrene	2.000	1.447	72	54-120	
Anthracene	2.000	1.308	65	27-133	
Fluoranthene	2.000	1.538	77	26-137	
Pyrene	2.000	1.480	74	45-129	
Benzo (a) Anthracene	2.000	1.398	70	33-143	
Chrysene	2.000	1.425	71	17-168	
Benzo (k) Fluoranthene	2.000	1.412	71	24-159	
Benzo (b) Fluoranthene	2.000	1.322	66	24-159	
Benzo (a) Pyrene	2.000	1.150	58	17-163	
Indeno (1,2,3-c,d) Pyrene	2.000	1.251	63	25-175	
Dibenz (a,h) Anthracene	2.000	1.391	70	25-175	
Benzo (g,h,i) Perylene	2.000	1.514	76	25-157	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.	Date Received: 10/29/14
354 Uluniu Street, Suite 304	Work Order: 14-10-2234
Kailua, HI 96734-2500	Preparation: EPA 5030C
	Method: GC/MS / EPA 8260B
Project: Red Hill LTM 112066	Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-057-72	LCS	Aqueous	GC/MS OO	10/31/14	10/31/14 21:09	141031L047
099-13-057-72	LCSD	Aqueous	GC/MS OO	10/31/14	10/31/14 21:37	141031L047

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acetone	50.00	66.09	132	N/A	N/A	40-140	N/A	0-20	
Benzene	50.00	50.90	102	N/A	N/A	80-120	N/A	0-20	
Bromodichloromethane	50.00	49.29	99	N/A	N/A	75-120	N/A	0-20	
Bromoform	50.00	50.67	101	N/A	N/A	70-130	N/A	0-20	
Bromomethane	50.00	43.60	87	N/A	N/A	30-145	N/A	0-20	
2-Butanone	50.00	55.76	112	N/A	N/A	30-150	N/A	0-20	
Carbon Tetrachloride	50.00	52.82	106	N/A	N/A	65-140	N/A	0-20	
Chlorobenzene	50.00	50.31	101	N/A	N/A	80-120	N/A	0-20	
Chloroethane	50.00	46.45	93	N/A	N/A	60-135	N/A	0-20	
Chloroform	50.00	51.26	103	N/A	N/A	65-135	N/A	0-20	
Chloromethane	50.00	46.27	93	N/A	N/A	40-125	N/A	0-20	
Dibromochloromethane	50.00	50.80	102	N/A	N/A	60-135	N/A	0-20	
1,2-Dibromo-3-Chloropropane	50.00	47.64	95	N/A	N/A	50-130	N/A	0-20	
1,2-Dibromoethane	50.00	52.19	104	N/A	N/A	80-120	N/A	0-20	
1,2-Dichlorobenzene	50.00	49.11	98	N/A	N/A	70-120	N/A	0-20	
1,3-Dichlorobenzene	50.00	49.80	100	N/A	N/A	75-125	N/A	0-20	
1,4-Dichlorobenzene	50.00	49.36	99	N/A	N/A	75-125	N/A	0-20	
1,1-Dichloroethane	50.00	50.29	101	N/A	N/A	70-135	N/A	0-20	
1,2-Dichloroethane	50.00	51.26	103	N/A	N/A	70-130	N/A	0-20	
1,1-Dichloroethene	50.00	50.07	100	N/A	N/A	70-130	N/A	0-20	
c-1,2-Dichloroethene	50.00	52.18	104	N/A	N/A	70-125	N/A	0-20	
t-1,2-Dichloroethene	50.00	53.26	107	N/A	N/A	60-140	N/A	0-20	
1,2-Dichloropropane	50.00	49.39	99	N/A	N/A	75-125	N/A	0-20	
c-1,3-Dichloropropene	50.00	53.06	106	N/A	N/A	70-130	N/A	0-20	
t-1,3-Dichloropropene	50.00	53.91	108	N/A	N/A	55-140	N/A	0-20	
Ethylbenzene	50.00	52.31	105	N/A	N/A	75-125	N/A	0-20	
Methylene Chloride	50.00	50.23	100	N/A	N/A	55-140	N/A	0-20	
4-Methyl-2-Pentanone	50.00	49.85	100	N/A	N/A	60-135	N/A	0-20	
Styrene	50.00	51.56	103	N/A	N/A	65-135	N/A	0-20	
1,1,1,2-Tetrachloroethane	50.00	51.98	104	N/A	N/A	80-130	N/A	0-20	
1,1,2,2-Tetrachloroethane	50.00	50.95	102	N/A	N/A	65-130	N/A	0-20	
Tetrachloroethene	50.00	51.34	103	N/A	N/A	45-150	N/A	0-20	
Toluene	50.00	50.99	102	N/A	N/A	75-120	N/A	0-20	
1,2,4-Trichlorobenzene	50.00	47.93	96	N/A	N/A	65-135	N/A	0-20	
1,1,1-Trichloroethane	50.00	52.27	105	N/A	N/A	65-130	N/A	0-20	
Hexachloro-1,3-Butadiene	50.00	49.37	99	N/A	N/A	50-140	N/A	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Environmental Science International, Inc.	Date Received:	10/29/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2234
Kailua, HI 96734-2500	Preparation:	EPA 5030C
	Method:	GC/MS / EPA 8260B
Project: Red Hill LTM 112066		Page 5 of 5

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
1,1,2-Trichloroethane	50.00	50.61	101	N/A	N/A	75-125	N/A	0-20	
Trichloroethene	50.00	50.27	101	N/A	N/A	70-125	N/A	0-20	
1,2,3-Trichloropropane	50.00	50.55	101	N/A	N/A	75-125	N/A	0-20	
Vinyl Chloride	50.00	49.26	99	N/A	N/A	50-145	N/A	0-20	
p/m-Xylene	100.0	103.2	103	N/A	N/A	75-130	N/A	0-20	
o-Xylene	50.00	51.96	104	N/A	N/A	80-120	N/A	0-20	
Methyl-t-Butyl Ether (MTBE)	50.00	50.09	100	N/A	N/A	65-125	N/A	0-20	
Gasoline Range Organics	1000	1009	101	1025	103	80-120	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-10-2234 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6020	EPA 3005A Filt.	598	ICP/MS 04	1
EPA 8015B (M)	EPA 3510C	682	GC 45	1
EPA 8270C SIM PAHs	EPA 3510C	923	GC/MS AAA	1
GC/MS / EPA 8260B	EPA 5030C	849	GC/MS OO	2

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Glossary of Terms and Qualifiers

Work Order: 14-10-2234 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
DL	The Detection Limit (DL) is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
ICH	Initial calibration verification recovery is above the control limit for this analyte.
ICJ	Initial calibration verification recovery is below the control limit for this analyte.
IH	Calibration verification recovery is above the control limit for this analyte.
IJ	Calibration verification recovery is below the control limit for this analyte.
J	Analyte was detected at a concentration below the LOQ and above the DL. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LOD	The Limit of Detection (LOD) is the smallest amount or concentration of a substance that must be present in a sample in order to be detected at 99% confidence level.
LOQ	The Limit of Quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at Detection Limit (DL) and is reported as less than the Limit of Detection (LOD).
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
Other locations: Concord, San Luis Obispo, Houston, and Corpus Christi
For courier service / sample drop off information,
contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **14-10-2234**

Date 10/28/14

Page 1 of 1

LABORATORY CLIENT: ESI

ADDRESS: 354 Uluniu St., Suite 304

CITY: Kailua HI STATE: 96734 ZIP:

TEL: (808) 261-0740 E-MAIL: jhattemer@esciencei.com, dfeher@esciencei.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066

P.O. NO.:

PROJECT CONTACT: Jeff Hattemer

SAMPLER(S): (PRINT) JH, KM

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF | GLOBAL ID | LOG CODE

SPECIAL INSTRUCTIONS:
Regular (full) GW monitoring analyte list

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	TPH(g) ☐ GRO (8260)	TPH(d) ☐ DRO (8015)	TPH ☐ C6-C36 ☐ C6-C44	TPH_____	BTEX / MTBE ☐ 8260 ☐	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead (6020)	Lead (200.8)		
1	ESTRIP	10/28/14	1100	water	3		X		X					X											
2	ES117	10/28/14	1200	water	~~10~~ 9		X		X	X				X						X				X	
3	ES118	10/28/14	1430	water	10		X	X	X	X				X						X			X		

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation) Fed Ex	Date: 10/28/14	Time: 1545
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 10/29/14	Time: 1010

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

01/01/14 Revision

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ED_006532_00009894-00155

ORIGIN ID:HNLA

SHIP DATE: 28OCT14
ACTWGT: 52.5 LB
CAD: /POS1525
DIMS: 26x15x14 IN

BILL RECIPIENT

UNITED STATES US

TO

CALSCIENCE
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 895-5494 REF:

INV:
PO: DEPT:

FedEx
Express

WED - 29 OCT AA
STANDARD OVERNIGHT

TRK# 0200 8045 5791 7375

WZ APVA

92841
CA-US SNA

2234

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WORK ORDER #: 14-10-2234

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 10/29/14

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.5 °C - 0.2 °C (CF) = 3.3 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: ☐ Air ☐ Filter Checked by: 15

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Checked by: 15

☑ Sample ☐ _____ ☐ No (Not Intact) ☐ Not Present Checked by: 836

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☑VOA (6) ☑VOAh (-1) (3) ☐VOA**na**$_2$ ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na**$_2$ ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☑1PB**n** ☐1PB**na** ☐500PB

☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na**$_2$ ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 140908B **Labeled/Checked by:** 836

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 852

Preservative: **h:** HCL **n:** HNO_3 **na**$_2$:$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 836

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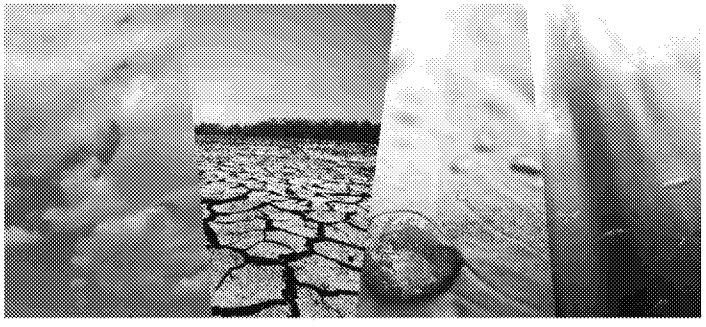
Supplemental Report 1

WORK ORDER NUMBER: 14-10-2234

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Environmental Science International, Inc.

Client Project Name: Red Hill LTM 112066

Attention: Jeff Hattemer
354 Uluniu Street, Suite 304
Kailua, HI 96734-2500

Approved for release on 11/05/2014 by:
Richard Villafania
Project Manager

ResultLink ▸

Email your PM ▸

nelac

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

ED_006532_00009894-00158

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Contents

Client Project Name: Red Hill LTM 112066
Work Order Number: 14-10-2234

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Work Order Narrative

Work Order: 14-10-2234 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/29/14. They were assigned to Work Order 14-10-2234.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Analytical Report

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	N/A
		Method:	EPA 200.8
		Units:	ug/L
Project: Red Hill LTM 112066			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ES117	**14-10-2234-2-J**	**10/28/14 12:00**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:46**	**141031L01D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Lead	0.211	1.00	0.0898	1.00	J

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-094-581**	**N/A**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:31**	**141031L01D**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Lead	<0.0898	1.00	0.0898	1.00	U

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Environmental Science International, Inc.	Date Received:	10/29/14
354 Uluniu Street, Suite 304	Work Order:	14-10-2234
Kailua, HI 96734-2500	Preparation:	N/A
	Method:	EPA 200.8
Project: Red Hill LTM 112066		Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
ES117	**Sample**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:46**	**141031S01A**
ES117	**Matrix Spike**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:35**	**141031S01A**
ES117	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:37**	**141031S01A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Lead	ND	100.0	100.7	101	100.8	101	80-120	0	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	N/A
		Method:	EPA 200.8
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
ES117	**Sample**	**Aqueous**	**ICP/MS 04**	**10/31/14 00:00**	**11/03/14 14:46**	**141031S01A**
ES117	**PDS**	**Aqueous**	**ICP/MS 04**	**10/31/14 00:00**	**11/03/14 14:39**	**141031S01A**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Lead	ND	100.0	99.82	100	75-125	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Environmental Science International, Inc.		Date Received:	10/29/14
354 Uluniu Street, Suite 304		Work Order:	14-10-2234
Kailua, HI 96734-2500		Preparation:	N/A
		Method:	EPA 200.8
Project: Red Hill LTM 112066			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-094-581	**LCS**	**Aqueous**	**ICP/MS 04**	**10/31/14**	**11/03/14 14:33**	**141031L01D**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Lead	100.0	95.21	95	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-10-2234 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 200.8	N/A	598	ICP/MS 04	1

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Glossary of Terms and Qualifiers

Work Order: 14-10-2234 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
Other locations: Concord, San Luis Obispo, Houston, and Corpus Christi
For courier service / sample drop off information,
contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **14-10-2234**

Date 10/28/14

Page 1 of 1

LABORATORY CLIENT: ESI

ADDRESS: 354 Uluniu St., Suite 304

CITY: Kailua HI STATE: 96734 ZIP:

TEL: (808) 261-0740 E-MAIL: jhattemer@esciencei.com, dfeher@esciencei.com

CLIENT PROJECT NAME / NUMBER: Red Hill LTM 112066

P.O. NO.:

PROJECT CONTACT: Jeff Hattemer

SAMPLER(S): (PRINT) JH, KM

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF | GLOBAL ID | LOG CODE

SPECIAL INSTRUCTIONS:
Regular (full) GW monitoring analyte list

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	~~TPH(g)~~ X (8260)	~~TPH(d)~~ X (8015)	TPH ☐ C6-C36 ☐ C6-C44	TPH ☐	BTEX / MTBE ☐ 8260 ☐	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM X	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	Lead (6020)	Lead (200.8)		
1	ESTRIP	10/28/14	1100	water	3		X		X					X												
2	ES117	10/28/14	1200	water	~~10~~ 10		X		X	X				X						X				X		
3	ES118	10/28/14	1430	water	10		X	X	X	X				X						X			X			

Relinquished by: (Signature) Jeff Hattemer	Received by: (Signature/Affiliation) Fed Ex	Date: 10/28/14	Time: 1545
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 10/29/14	Time: 1010

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

01/01/14 Revision

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ED_006532_00009894-00167

ORIGIN ID:HNLA

SHIP DATE: 28OCT14
ACTWGT: 52.5 LB
CAD: /POS1525
DIMS: 26x15x14 IN

BILL RECIPIENT

UNITED STATES US

TO

CALSCIENCE
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 895-5494 REF:

INV:

PO: DEPT:

FedEx
Express

WED - 29 OCT AA
STANDARD OVERNIGHT

TRK# 0200 8045 5791 7375

WZ APVA

92841
CA-US SNA

234

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WORK ORDER #: 14-10-[2][2][3][4]

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ESI

DATE: 10/29/14

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.5 °C - 0.2 °C (CF) = 3.3 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: ☐ Air ☐ Filter Checked by: 15

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Checked by: 15

☑ Sample ☐ _____ ☐ No (Not Intact) ☐ Not Present Checked by: 836

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☑ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☑VOA (6) ☑VOAh (-1) (3) ☐VOA**na**$_2$ ☐125AGB ☐125AGB**h** ☐125AGB**p** ☑1AGB (2) ☐1AGB**na**$_2$ ☐1AGB**s**

☐500AGB ☑500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☑1PB**n** ☐1PB**na** ☐500PB

☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na**$_2$ ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:** 140908B **Labeled/Checked by:** 836

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 852

Preservative: **h:** HCL **n:** HNO_3 **na**$_2$:$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 836

RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2234**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 11:16
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	

DATA FILE: W:\GC_45\GC 45 DATA\2014\141030\14103067.D\14103067

 # 2 **CLIENT SAMPLE NUMBER: ES117**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, ai qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	4440	1.00	22.2	11	12	25	bJ

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103067.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2234-2

Vial Number : Vial 67
Injection Number : 1
Sequence Line : 67
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 11:16 am
Report Created on: 04 Nov 14 02:51 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.455	0.77	0	VV	0.054	0.105
2	2.637	1.41	0	VV	0.039	0.193
3	2.694	1.80	1	VV	0.051	0.247
4	2.750	2.10	1	VV	0.036	0.287
5	2.837	0.86	0	VV	0.032	0.118
6	2.885	0.68	0	VV	0.024	0.093
7	2.945	1.24	0	VV	0.052	0.170
8	3.169	5.53	1	VV	0.053	0.756
9	3.272	2.00	1	VV	0.044	0.273
10	3.344	4.42	1	VV	0.067	0.605
11	3.437	3.47	1	VV	0.044	0.474
12	3.486	11.09	1	VV	0.130	1.517
13	3.718	7.85	1	VV	0.107	1.074
14	3.850	2.34	1	VV	0.041	0.321
15	3.916	2.44	1	VV	0.054	0.333
16	4.020	2.87	2	VV	0.024	0.393
17	4.082	2.19	0	VB	0.081	0.300
18	4.239	2.57	1	BV	0.056	0.351
19	4.403	1.51	0	VV	0.049	0.206
20	4.444	1.36	0	VB	0.042	0.186
21	4.590	0.91	0	BV	0.061	0.125
22	4.701	1.77	0	VV	0.067	0.242
23	4.850	0.97	0	VV	0.033	0.132
24	4.911	0.53	0	VV	0.030	0.072
25	4.967	0.44	0	VV	0.028	0.061
26	5.069	1.34	1	VV	0.027	0.184
27	5.376	666.87	439	VV	0.025	91.184

Total area = 731.35

Area Percent Report

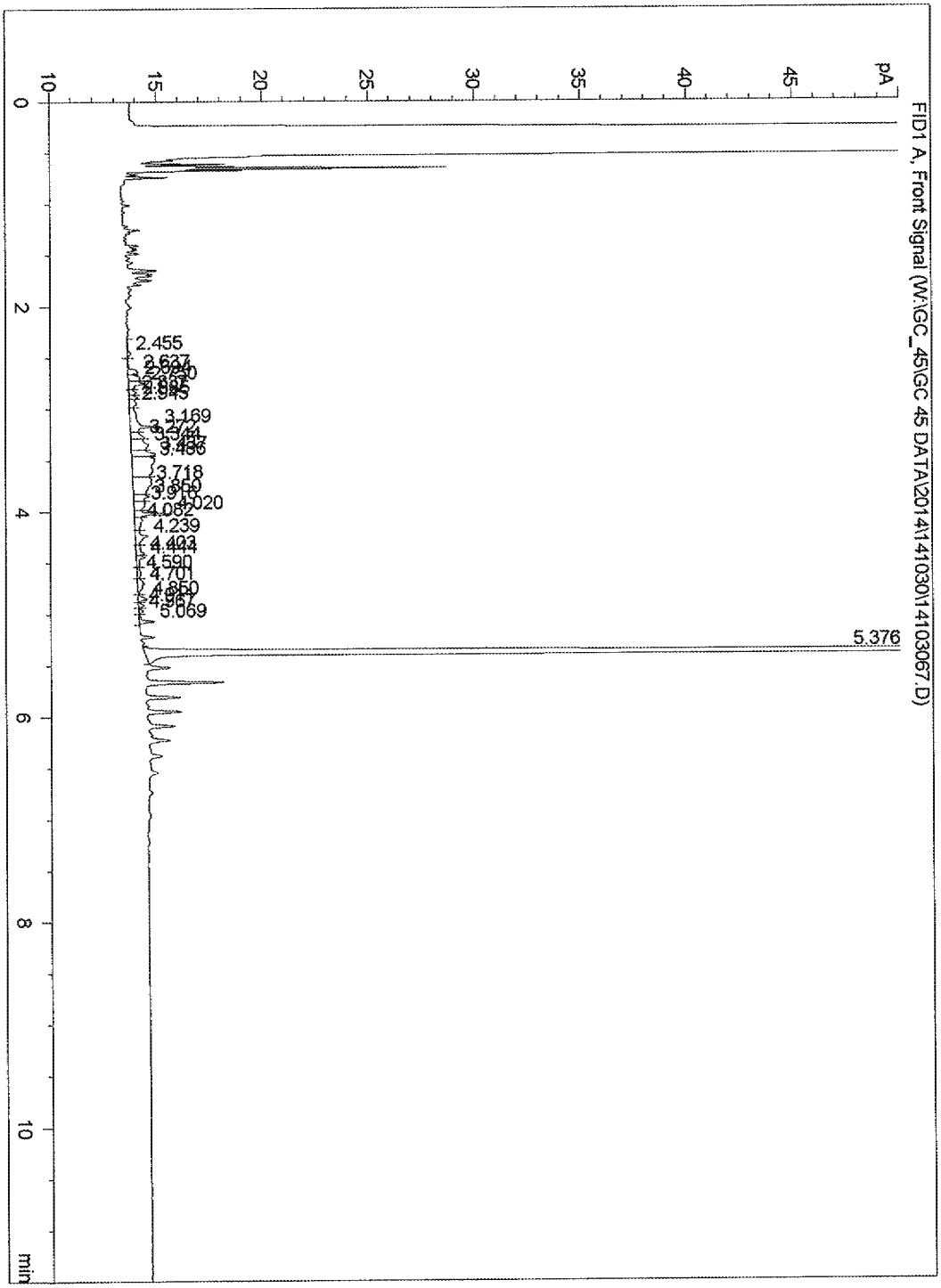
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103067.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2234-2

Vial Number : Vial 67
Injection Number : 1
Sequence Line : 67
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 11:16 am
Report Created on: 04 Nov 14 02:51 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



RAW DATA SHEET
FOR METHOD: EPA 8015B (M)

WORK ORDER:	**14-10-2234**	ANALYZED BY:	682
INSTRUMENT:	GC 45	D/T ANALYZED:	2014-10-31 11:35
EXTRACTION:	EPA 3510C	REVIEWED BY:	
D/T EXTRACTED:	2014-10-30 00:00	D/T REVIEWED:	

DATA FILE: W:\GC 45\GC 45 DATA\2014\141030\14103068.D\14103068

 # 3 **CLIENT SAMPLE NUMBER: ES118**

LCS/MB BATCH:	141030B06	SAMPLE VOLUME / WEIGHT:	DEFAULT: 500.00 ml / ACTUAL: 500.00 ml
MS/MSD BATCH:		FINAL VOLUME / WEIGHT:	DEFAULT: 5.00 ml / ACTUAL: 2.50 ml
UNITS:	ug/L	ADJUSTMENT RATIO TO PF:	0.50

COMMENT: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, a qualified with a "J" flag. TPH as Diesel is quantified in the carbon range C10-C28.

COMPOUND	INI. CONC	DF	CONC	DL	LOD	LOQ	QUAL
TPH as Diesel	3240	1.00	16.2	11	12	25	bJ

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103068.D
Page Number : 1
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2234-3
Vial Number : Vial 68
Injection Number : 1
Sequence Line : 68
Instrument Method: C:\CHEM32\1\METHODS\ ->
Acquired on : 31 Oct 14 11:35 am
Report Created on: 04 Nov 14 02:53 pm
Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Sig. 1 in W:\GC_45\GC 45 DATA\2014\141030\ ->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	2.457	0.55	0	VV	0.050	0.091
2	2.601	0.48	0	VV	0.021	0.080
3	2.640	0.60	0	VV	0.024	0.101
4	2.689	1.65	0	VV	0.058	0.276
5	2.752	1.54	1	VV	0.038	0.257
6	2.837	0.65	0	VV	0.034	0.108
7	2.885	0.64	0	VV	0.033	0.107
8	2.942	0.65	0	VV	0.043	0.109
9	3.101	1.29	0	VV	0.073	0.216
10	3.169	3.26	2	VV	0.026	0.545
11	3.342	3.49	1	VV	0.110	0.583
12	3.437	1.96	1	VV	0.049	0.327
13	3.481	1.65	1	VV	0.040	0.275
14	3.527	1.70	1	VV	0.042	0.284
15	3.596	3.74	1	VV	0.095	0.624
16	3.684	1.55	1	VV	0.047	0.259
17	3.755	3.47	1	VV	0.089	0.579
18	3.851	1.60	1	VV	0.045	0.268
19	3.916	0.61	0	VV	0.024	0.103
20	3.944	1.04	0	VV	0.047	0.174
21	4.020	2.38	2	VV	0.022	0.398
22	4.089	1.00	0	VV	0.054	0.167
23	4.132	0.32	0	VV	0.024	0.053
24	4.160	0.20	0	VV	0.022	0.033
25	4.239	2.07	1	VV	0.056	0.346
26	4.357	0.79	0	VV	0.044	0.132
27	4.406	1.51	0	VV	0.055	0.253
28	4.596	0.74	0	VV	0.065	0.124
29	4.723	1.18	0	VV	0.054	0.198
30	4.737	1.47	1	VV	0.030	0.246
31	4.851	0.96	0	VV	0.037	0.161
32	4.913	0.71	0	VV	0.030	0.118
33	4.972	0.41	0	VV	0.023	0.069
34	5.024	0.16	0	VV	0.023	0.027
35	5.073	0.91	1	VV	0.024	0.153
36	5.270	0.06	0	VM	0.010	0.010
37	5.379	551.80	370	VV	0.025	92.147

Area Percent Report

Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103068.D
Page Number : 2
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2234-3
Acquired on : 31 Oct 14 11:35 am
Report Created on: 04 Nov 14 02:53 pm

Vial Number : Vial 68
Injection Number : 1
Sequence Line : 68
Instrument Method: C:\CHEM32\1\METHODS\ ->
Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies

Total area = 598.83

Area Percent Report

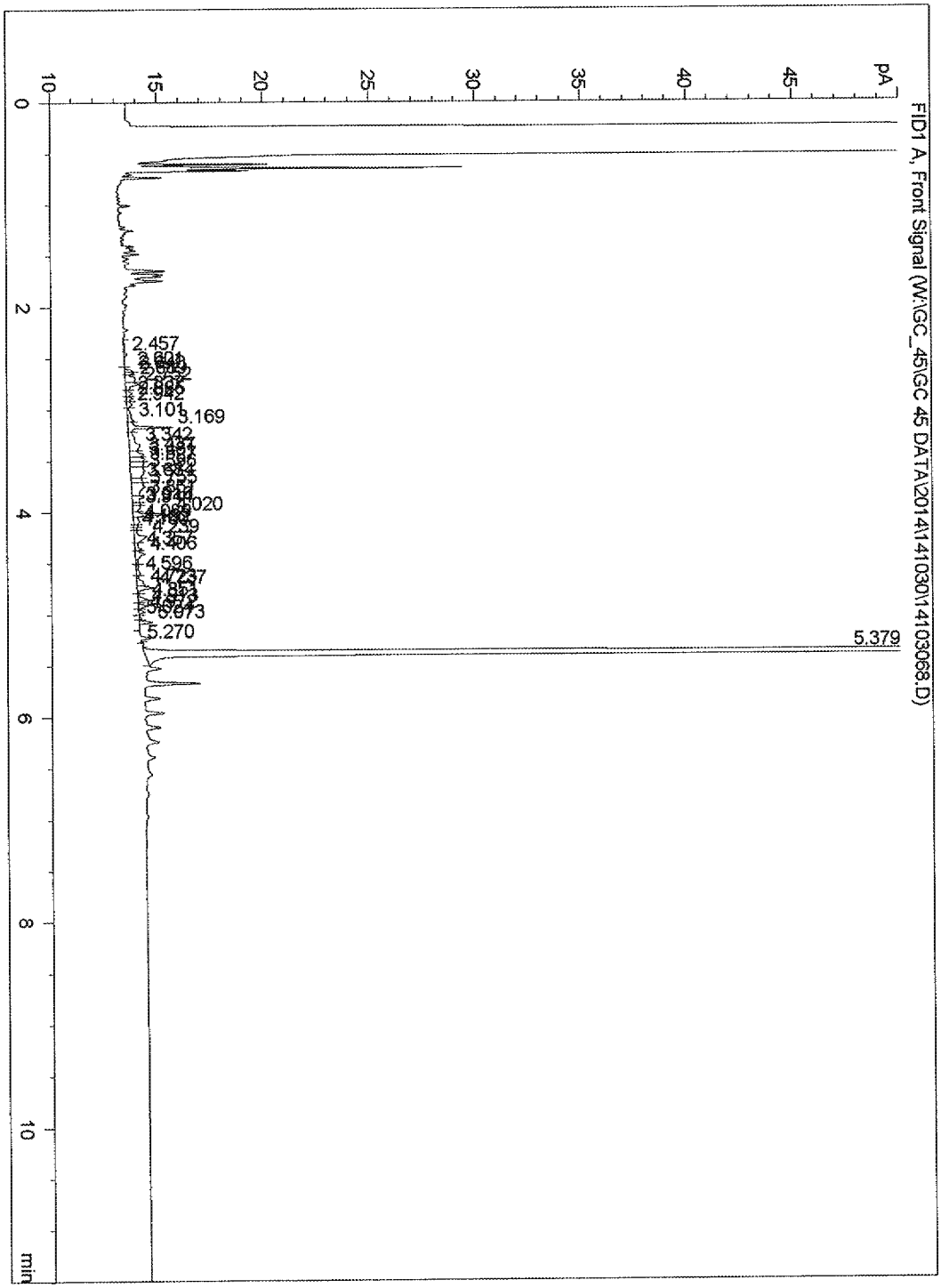
Data File Name : W:\GC_45\GC 45 DATA\2014\141030\14103068.D
Page Number : 3
Operator : 682
Instrument : GC 45
Sample Name : 14-10-2234-3

Vial Number : Vial 68
Injection Number : 1
Sequence Line : 68
Instrument Method: C:\CHEM32\1\METHODS\ ->

Acquired on : 31 Oct 14 11:35 am
Report Created on: 04 Nov 14 02:53 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341] Copyright © Agilent Technologies



APPENDIX D

Historical Groundwater Exceedances

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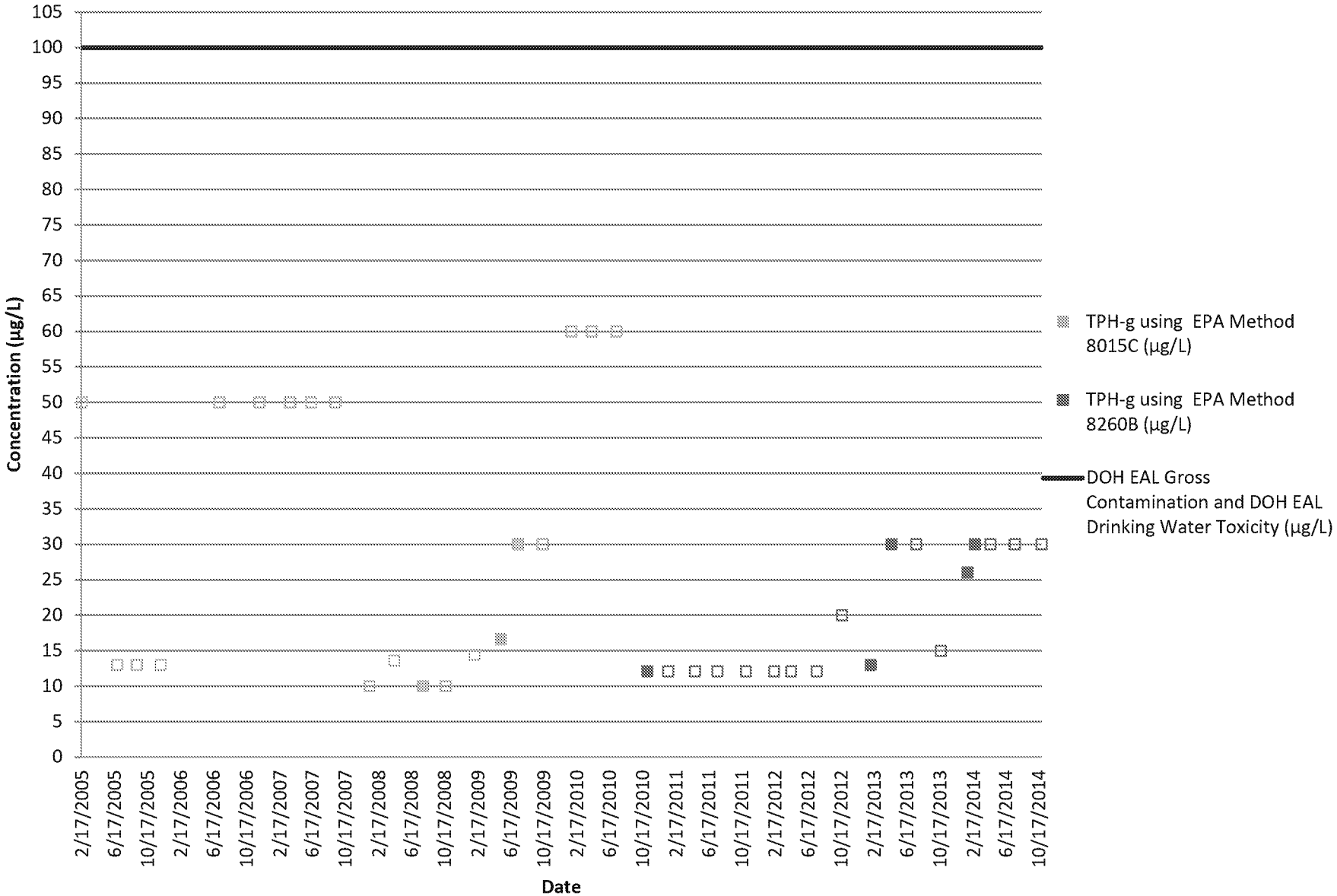
TPH-g Concentrations for RHMW01



Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.
Possible laboratory contamination for 10/22/2012, 10/21/2013, and 1/28/2014 sampling events.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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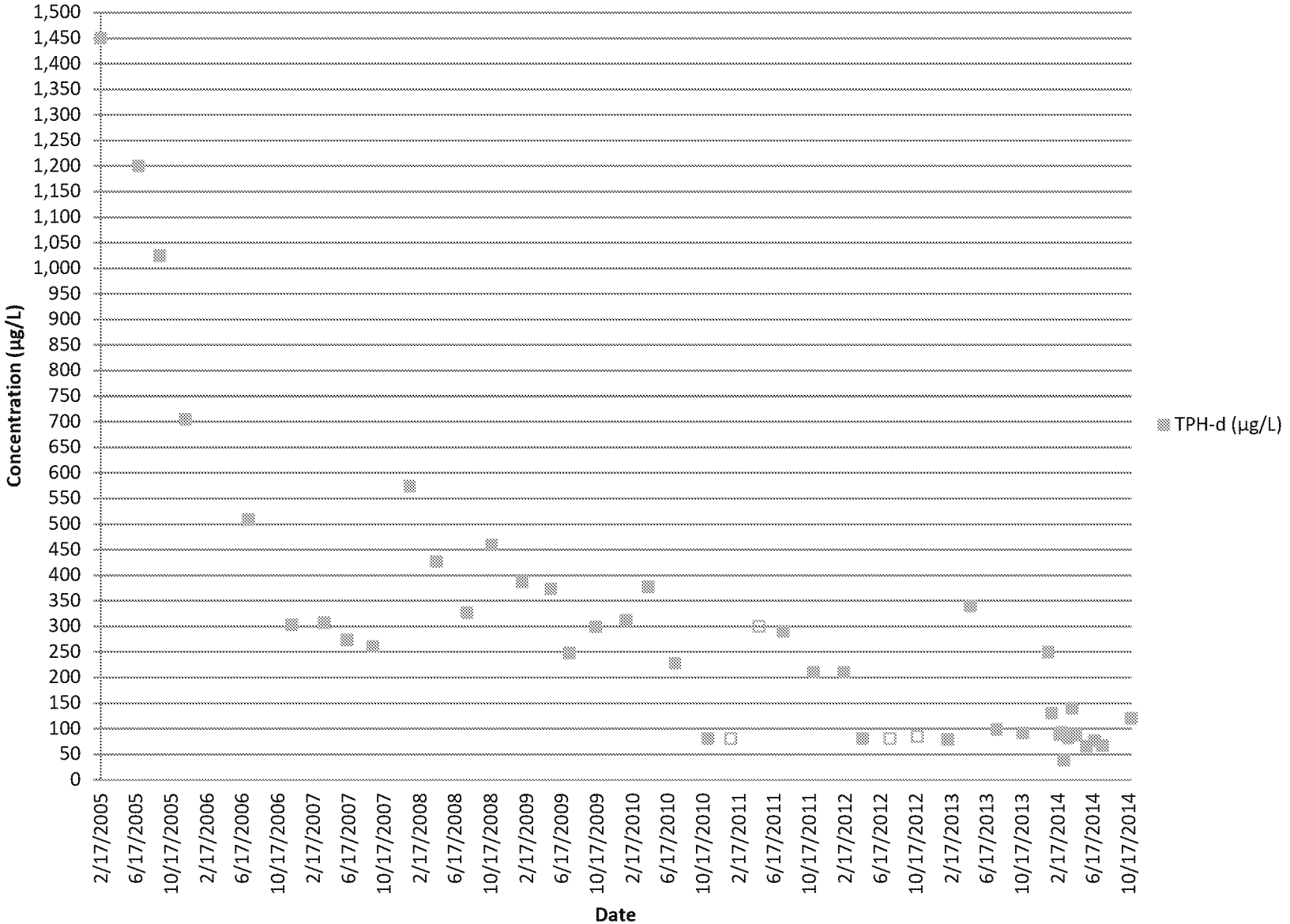
TPH-d Concentrations for RHMW01



Unfilled boxes indicate non-detections. Method detection limits are shown.

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

Data points for 2/17/2005 through 9/8/2005 and 12/6/2005 are the average of the primary and duplicate samples.

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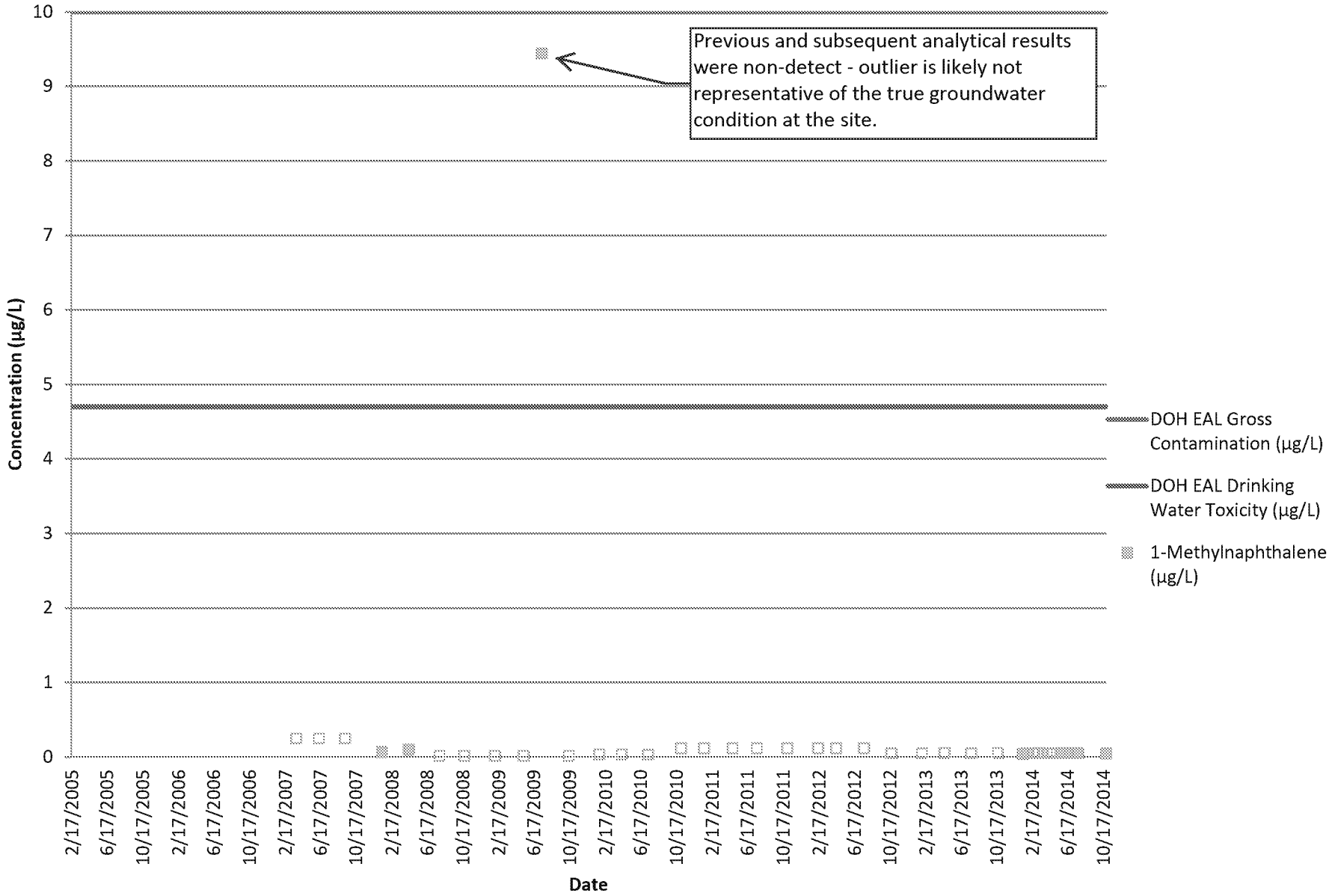
1-Methylnaphthalene Concentrations for RHMW01



Unfilled boxes indicate non-detections. Method detection limits are shown.

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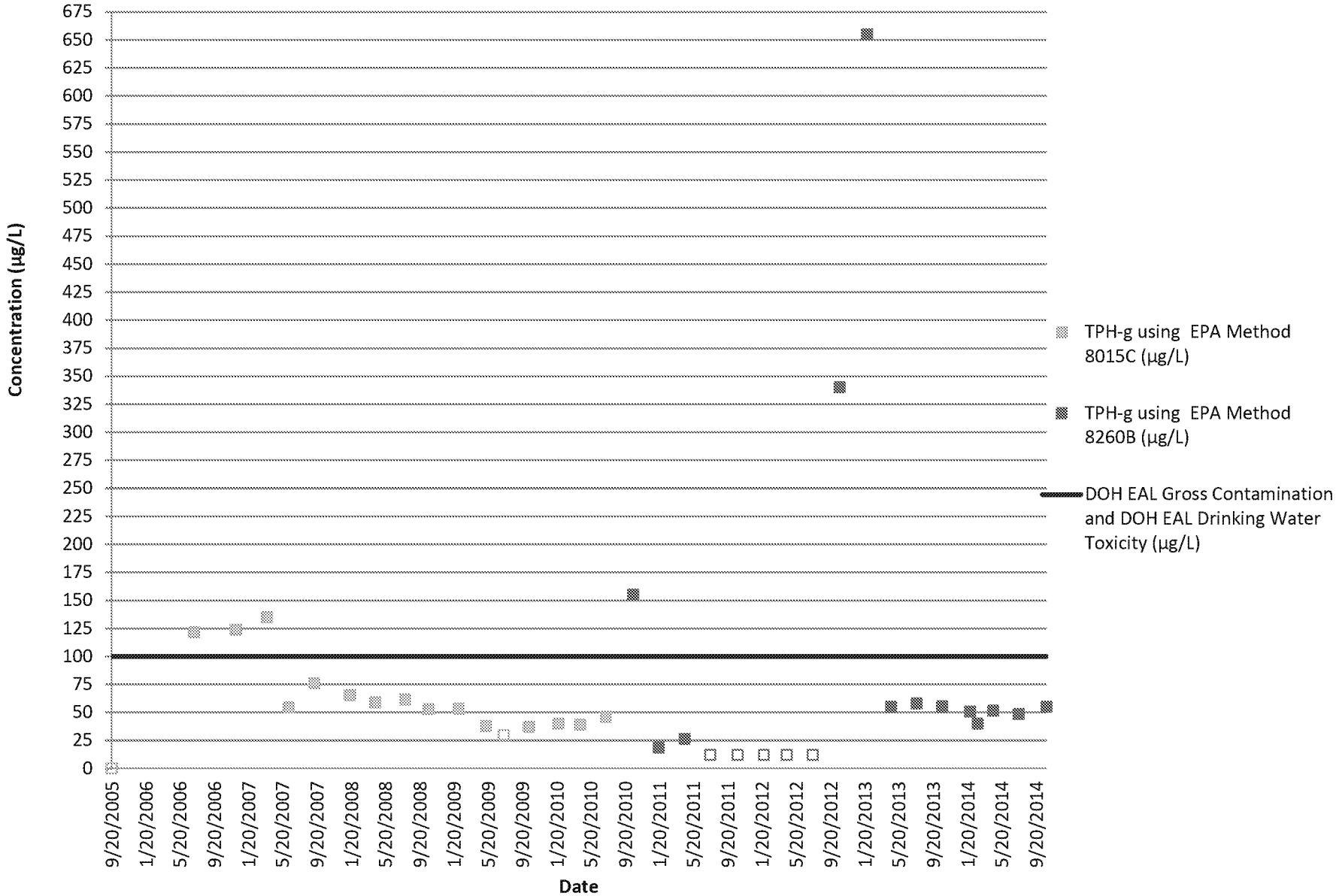
TPH-g Concentrations for RHMW02



Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.

Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.

Unfilled boxes indicate non-detections. Method detection limits are shown.

Primary sample results are shown for 1/26/2012 and 7/18/2012; all other concentrations are the average of the primary and duplicate sample results.

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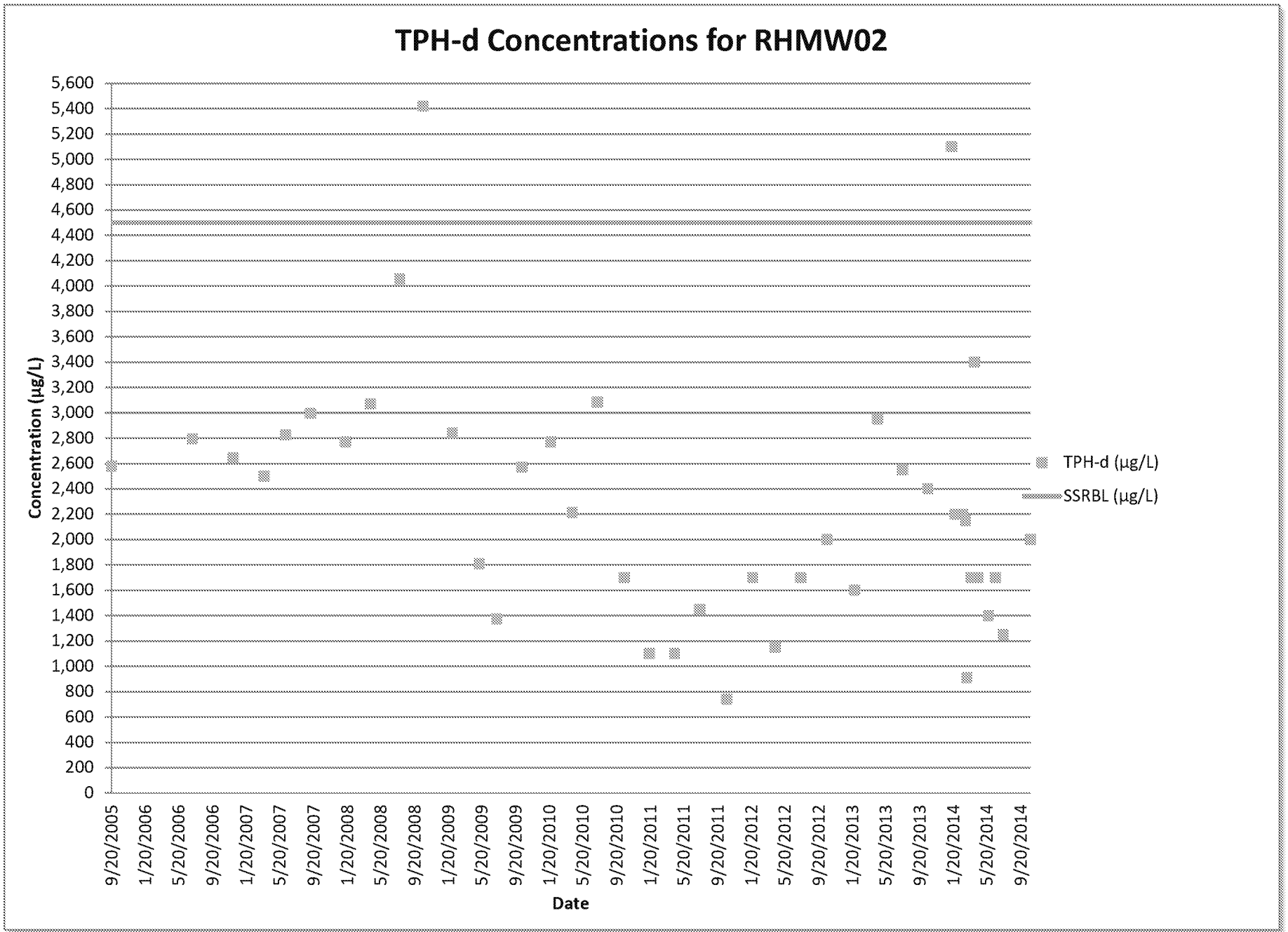

Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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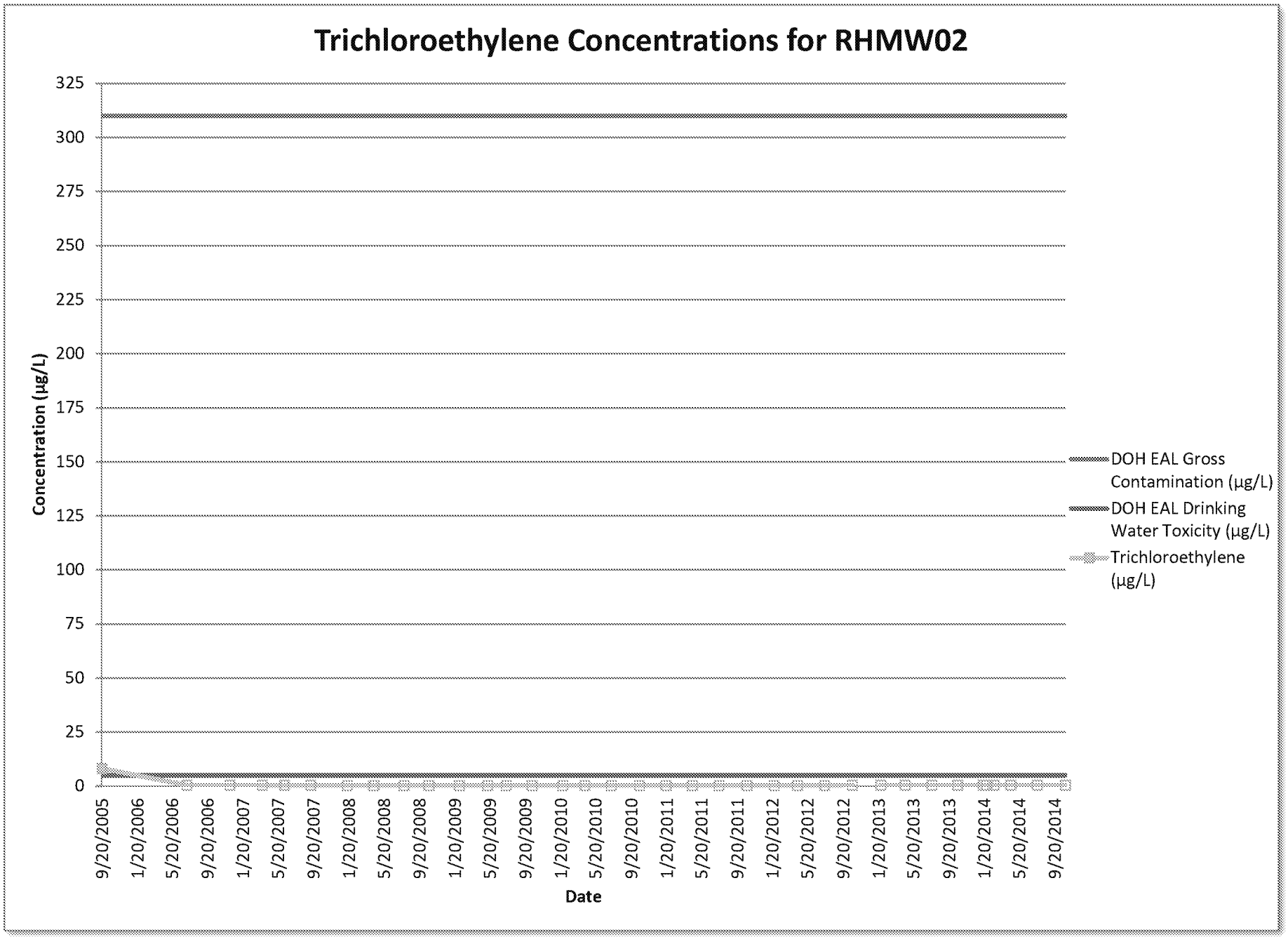

Data points for 9/20/2005 through 4/21/2014 are the average of the primary and duplicate samples.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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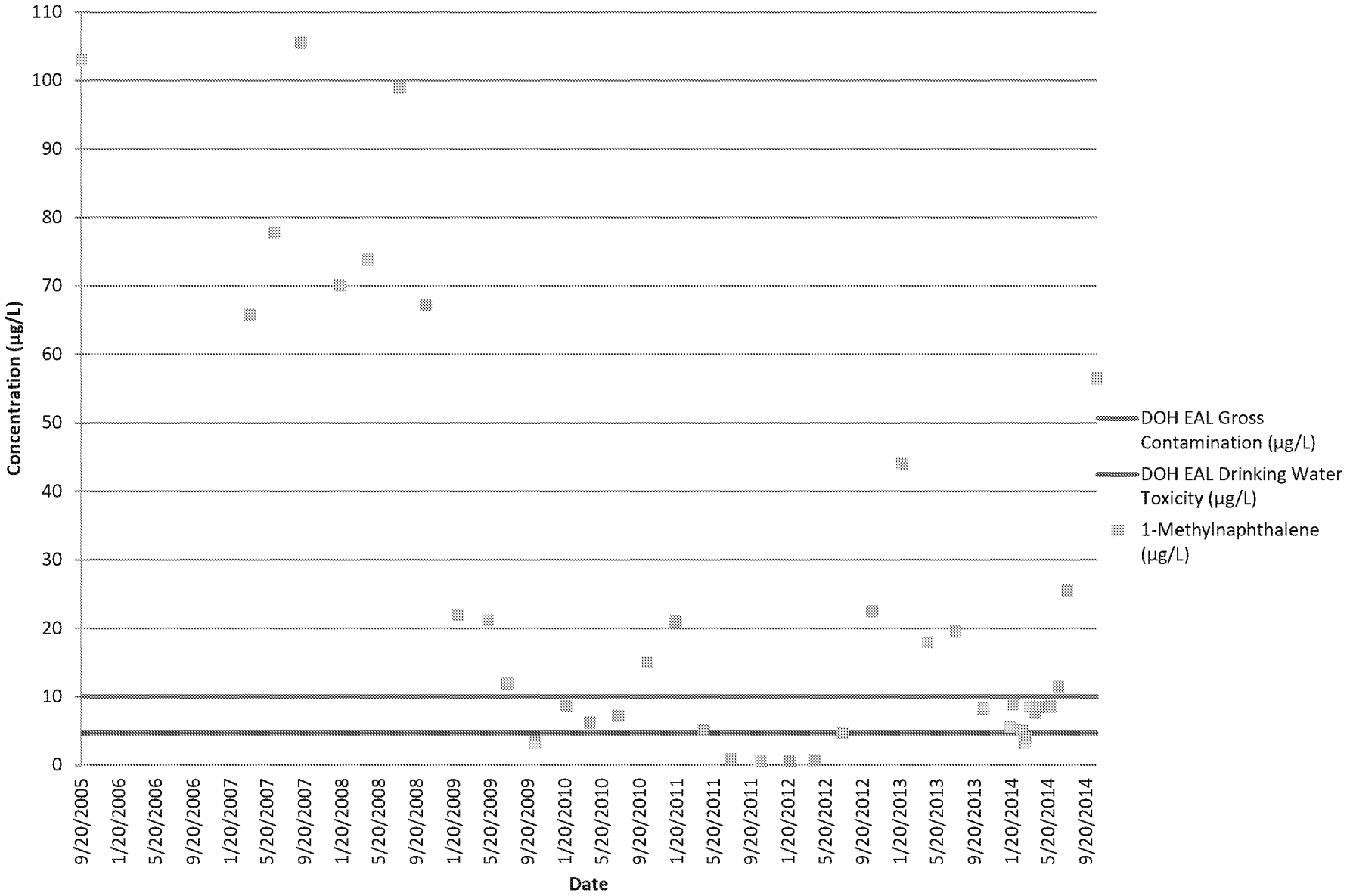
1-Methylnaphthalene Concentrations for RHMW02



Data points for 9/20/2005 and 3/27/2007 through 4/21/2014 are the average of the primary and duplicate samples.

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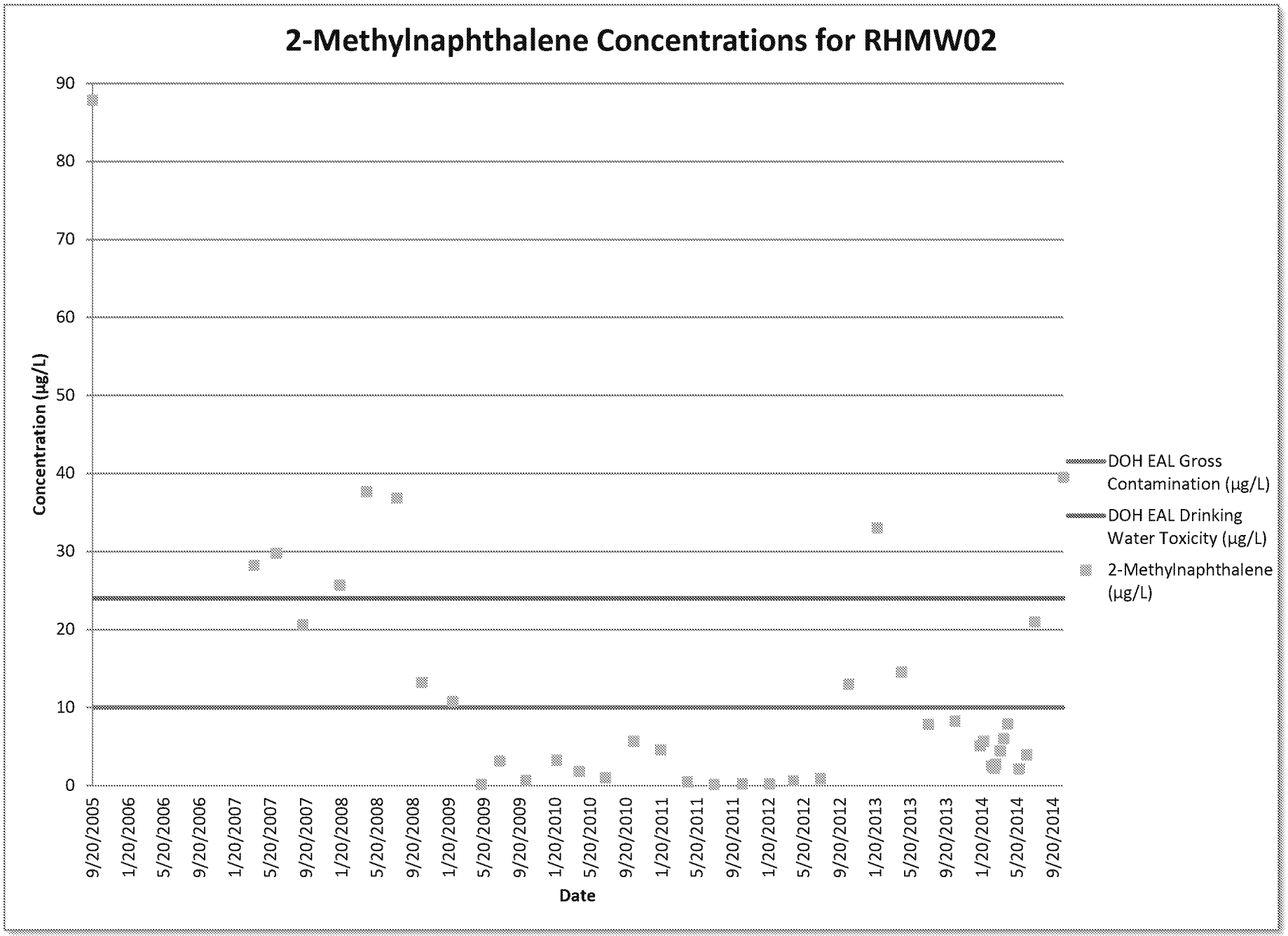

Data points for 9/20/2005 and 3/27/2007 through 4/21/2014 are the average of the primary and duplicate samples.

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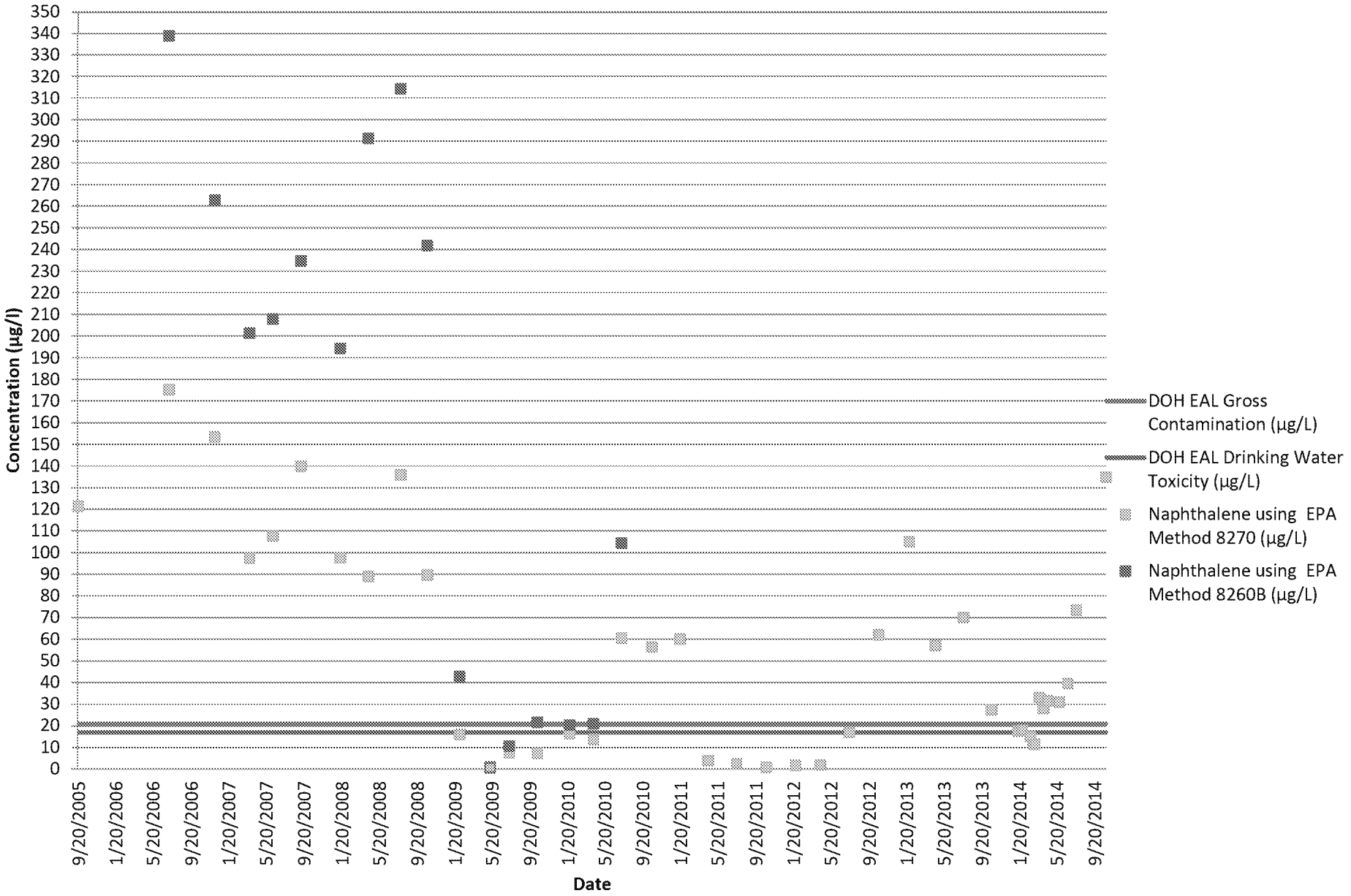
Naphthalene Concentrations for RHMW02



Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.

Unfilled boxes indicate non-detections. Method detection limits are shown.

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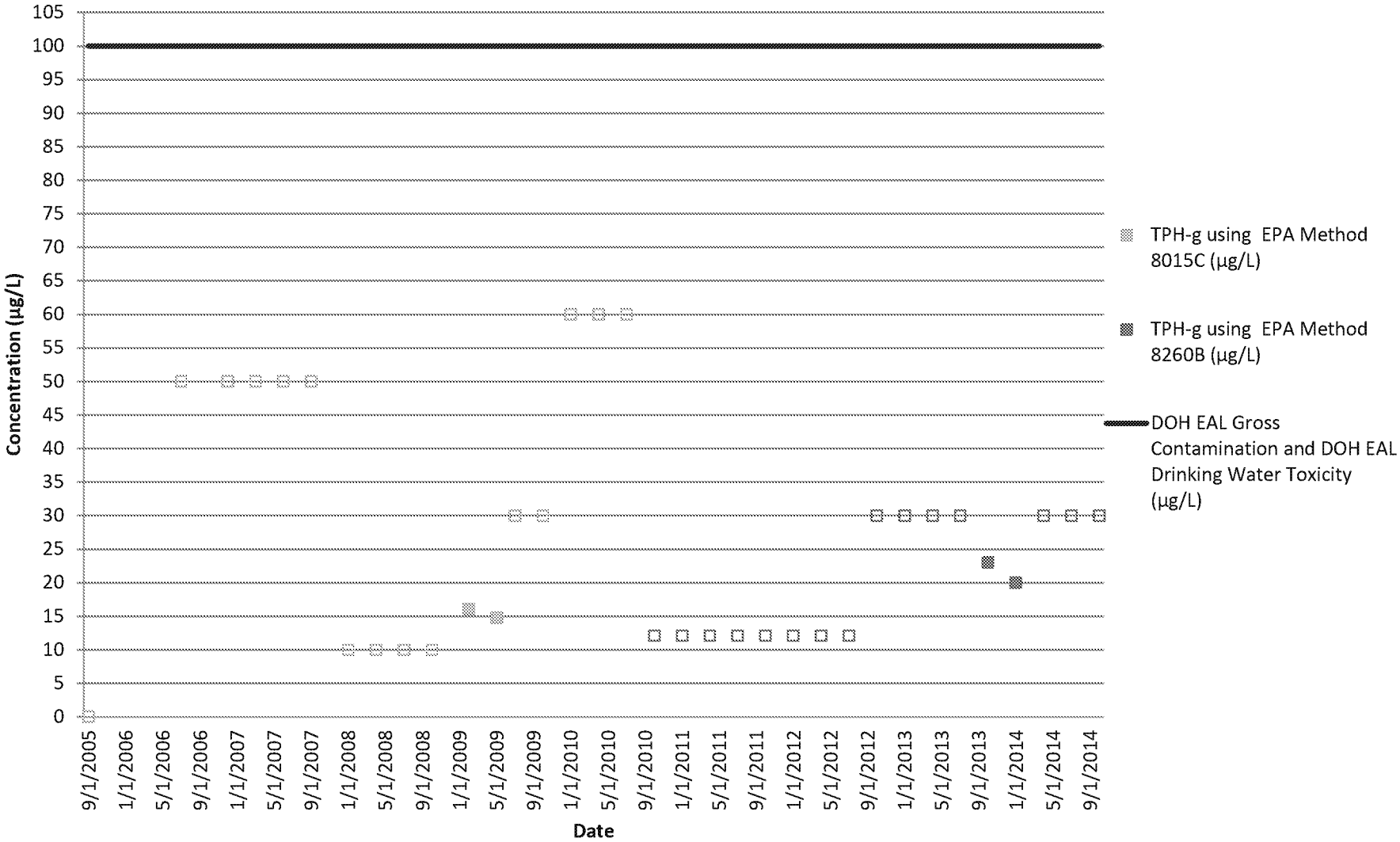
TPH-g Concentrations for RHMW03



Possible laboratory contamination for 10/21/2013 and 1/28/2014 sampling events.
Unfilled boxes indicate non-detections. Method detection limits are shown.

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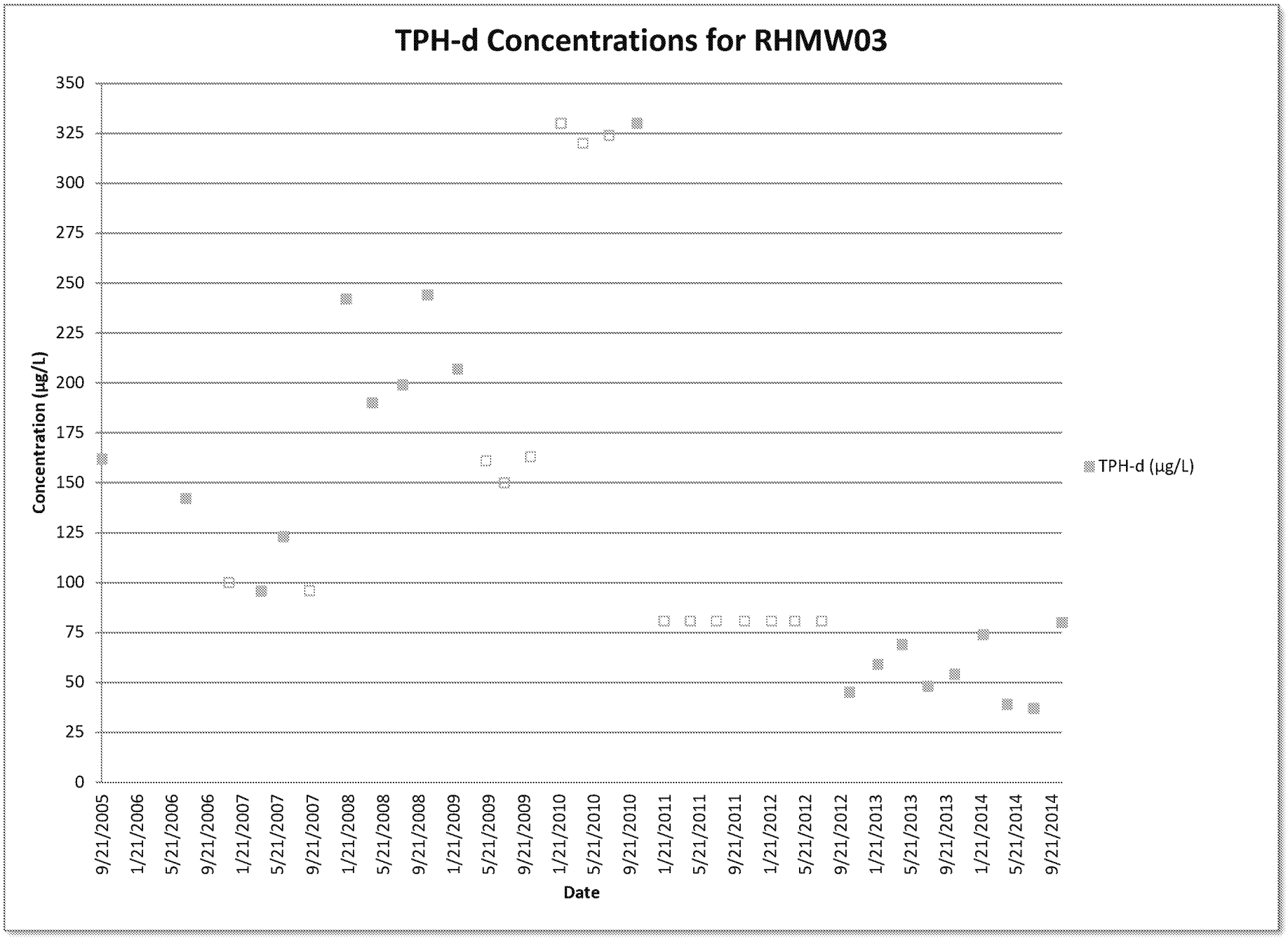

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Unfilled boxes indicate non-detections. Method detection limits are shown.

Numerous sample results had a chromatographic pattern that didn't match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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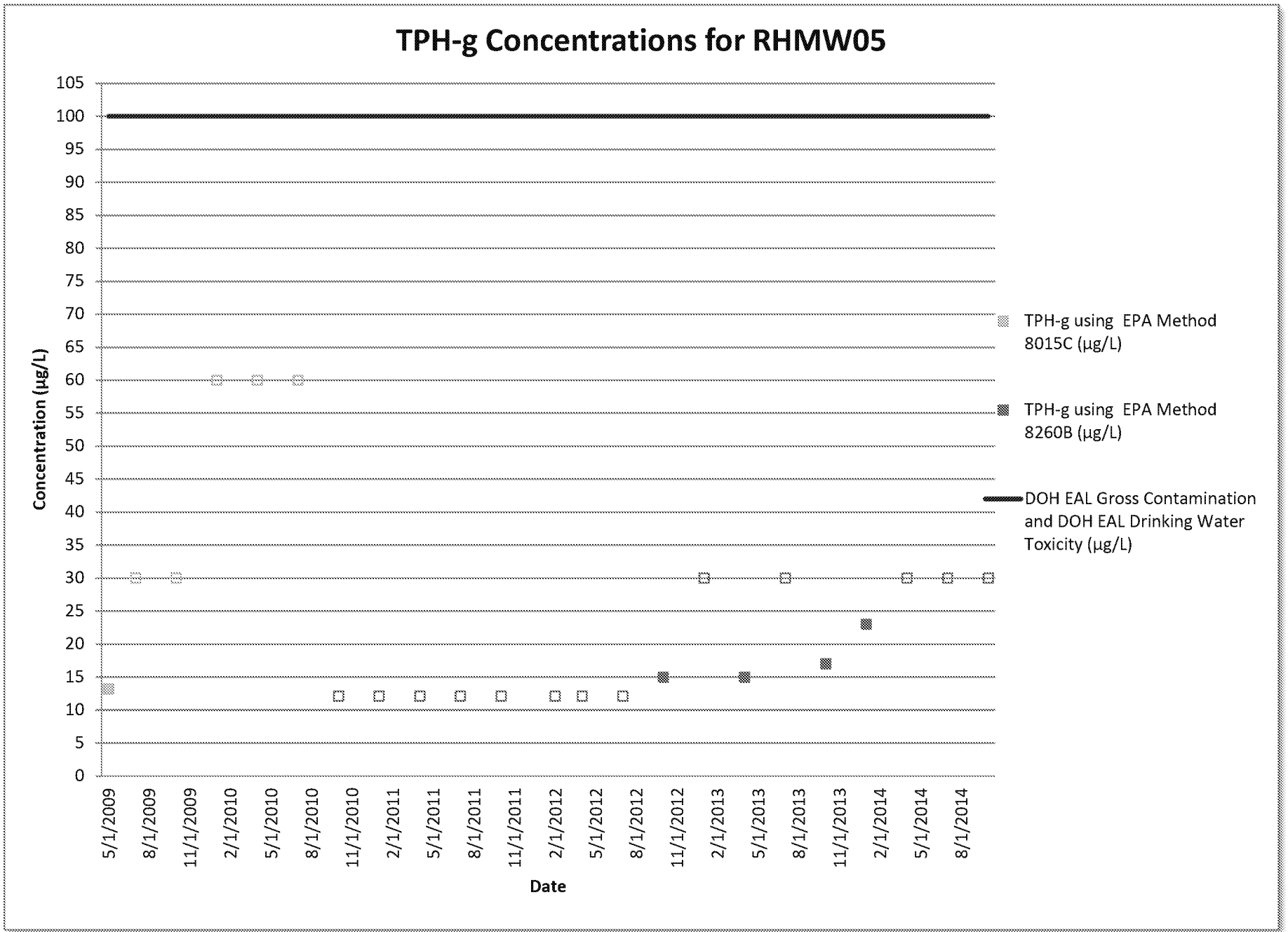

Data point for 7/17/2012 is the average of the primary and duplicate samples.

Unfilled boxes indicate non-detections. Method detection limits are shown.

Possible laboratory contamination for 10/22/2012, 10/22/2013, and 1/29/2014 sampling events.

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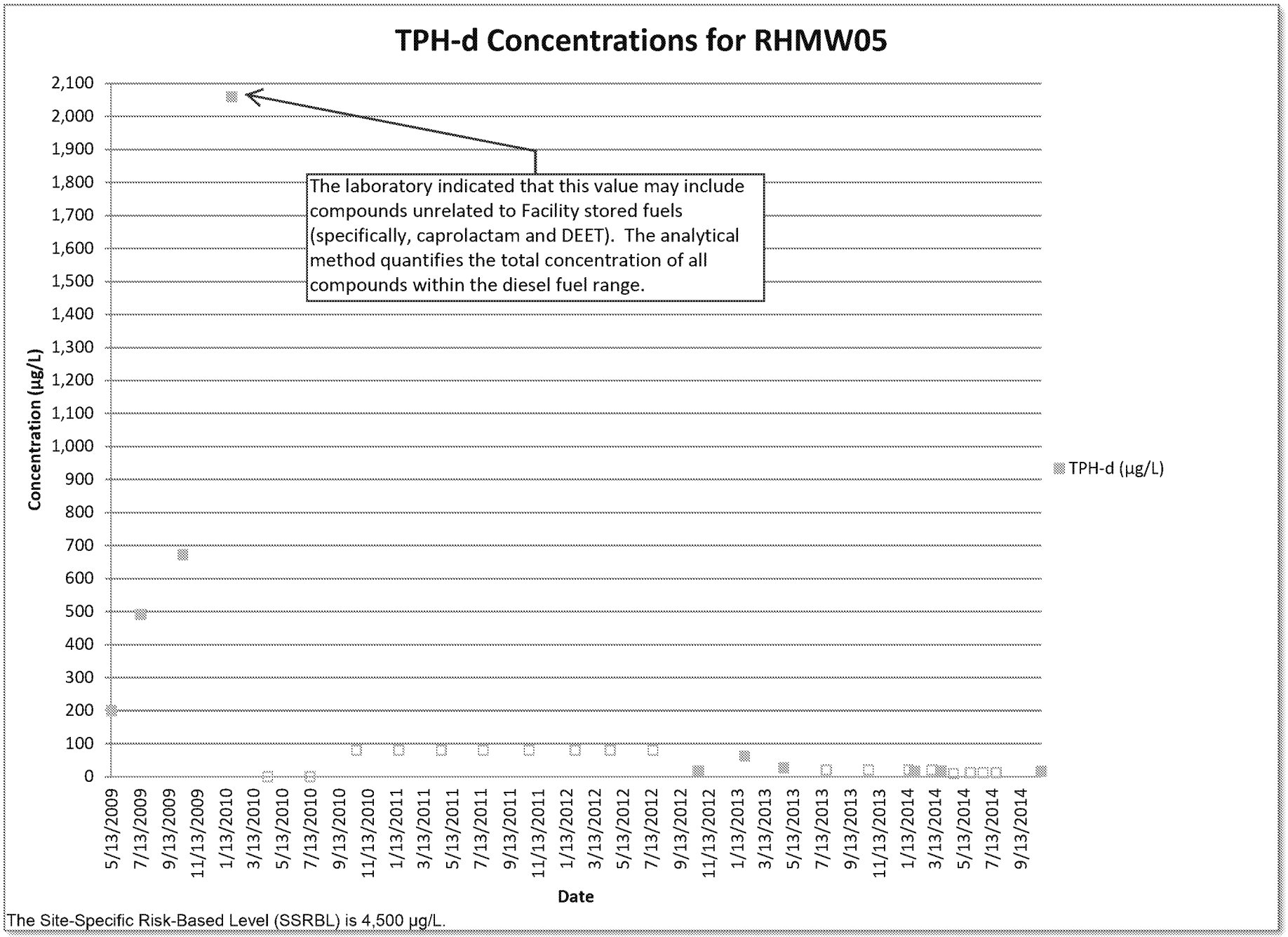

The Site-Specific Risk-Based Level (SSRBL) is 4,500 µg/L.

Data point for 7/17/2012 is the average of the primary and duplicate samples.

Unfilled boxes indicate non-detections. Method detection limits are shown.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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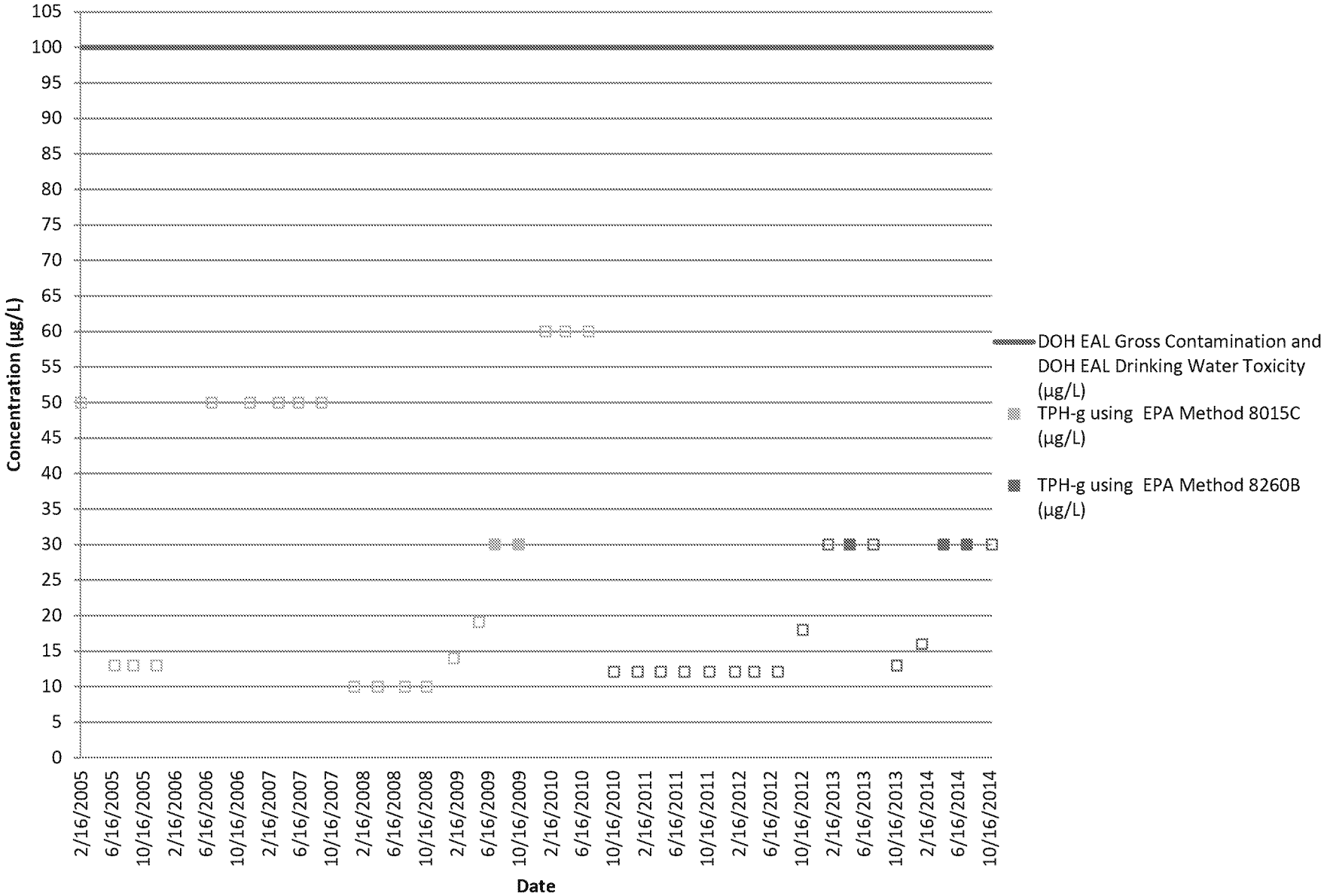
TPH-g Concentrations for RHMW2254-01



Unfilled boxes indicate non-detections. Method detection limits are shown.

Possible laboratory contamination for 10/22/2012, 10/22/2013, and 1/29/2014 sampling events.

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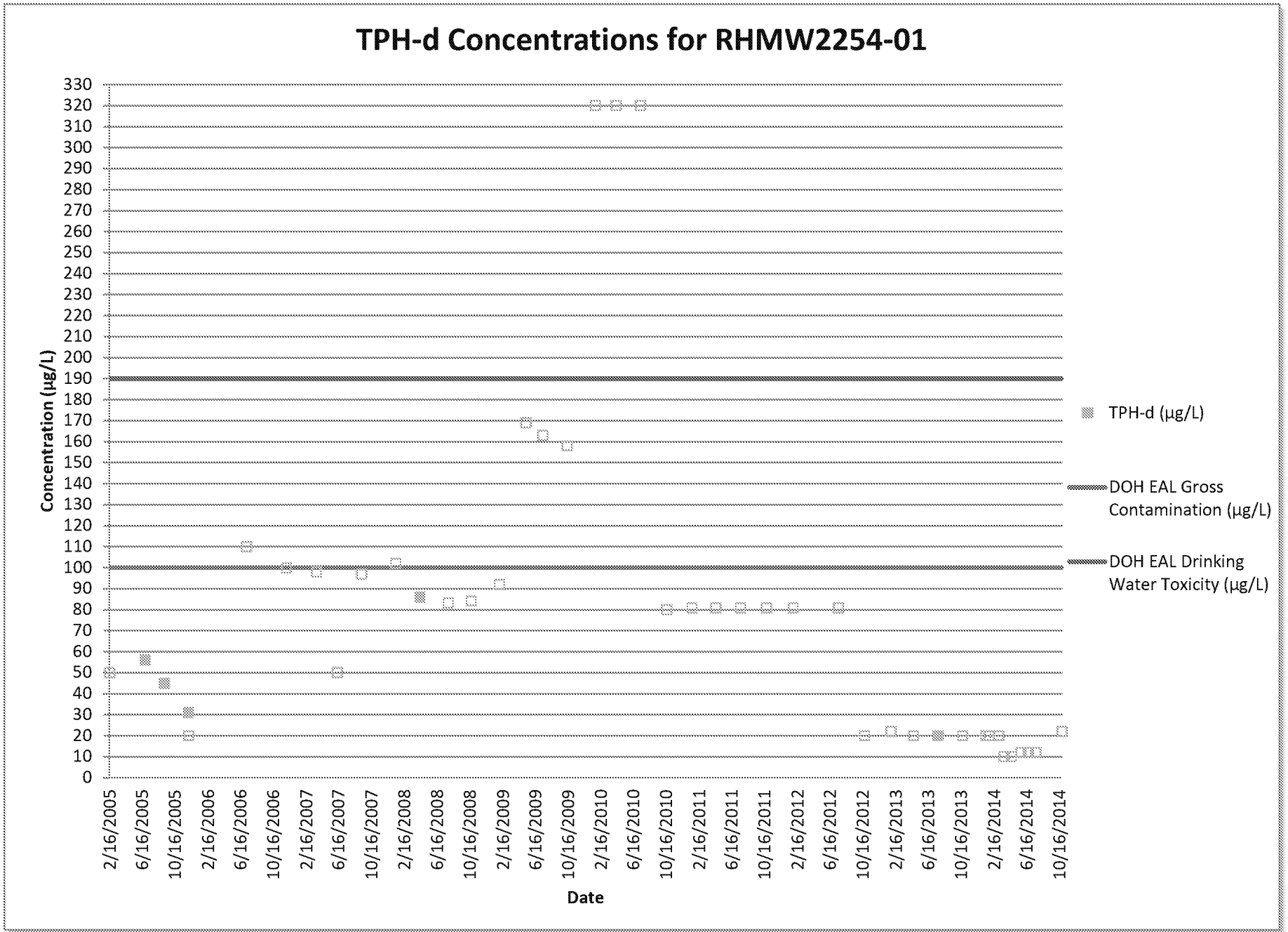

Unfilled boxes indicate non-detections. Method detection limits are shown.

Laboratory data rejected for 1/15/2008 sampling event.

Numerous sample results had a chromatographic pattern that did not match the calibration standard. The relatively high TPH-d values may not necessarily be indicative that there is diesel fuel or other petroleum products in the well.

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APPENDIX E

Cumulative Groundwater Results (included on attached CD)

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